1- 84

8

Nymphaeaceae

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MO

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cm copyright reserved MO

Leaves of Nymphaeaceae

Jan 1865

While in Nelumbium all the nervation of the leaf originate, from the end of the petiole itself, and the midrib is almost undistinguishable from the other ribs,

in Nymphaeaceae proper (Victoria excepted?) at least in Nymphaea and Nuphar with cordate leaves, the venation is quite distinct, part of the nerves or ribs (the lower ones) start from the base, and another part from the strong midrib.

And I find this difference between all the species examined by me of Nymphaea and of Nuphar, that in

Nuphar comparatively few nerves or ribs are basilar while much the greater number start from the midrib; but in

Nymphaea the greatest number of ribs is basilar and by far the smallest connect with the midrib.

In other words: Nuphar and Nymphaea have a compound system of nervation; they are both palmatinerved and pinnati-nerved: but Nuphar is preponderately pinn and Nymphaea preponderately palmatinerved.

Any single leaf of all the species I could examine show this *generic* character.

Nymphaea

			lateral nerves from base	lateral nerves from midrib	
N. alba	Germany	14–18	14.	8	8–10
			14.	8	
			14	10	
			14	10	
			16	8	
			16.	10	
			18	10	
N. odorata	St Louis	18–24	18	10	8–10
			20	8	
			24	8	
	var minor, Lake George,	8–10	8	6	6–8
			10	6	
			10	8	
N. Capensis		20–22	20	12	12
			22	12	
		8–24		6–12	
N. minor basiopoda	Geo		9	4	
			10	5	
N. tuberculata (fide Paine)			24	8–10	

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Nymphaea alba at Herrenalb
Schwarzwald
July 1883
flowers 8 inches diamet., 24 petals
the innermost ones narrow and small
19 stigmas; red, free at top.

18

Very resp

Dr. Geo. Eng

(11551—1000.)

June 1865

Nuphar has more feather veined leaves
Nymphaea more radiate veined
i Nuphar most of the veins start from the midrib
i Nymphaea most from the base

Nymphaea alba, Europe, has veins not prominent
16 or 18 from the base, and 6-10 from the midrib

Nymph. odorata, St. Louis, has veins very prominent
on under side, 24 to 28 from the base
and only 4 to 6 from the midrib

Leitch & Corliss
DRUGGISTS
South-west Corner Fifth and Market Streets

	basal ribs	lateral from midrib	length	breadth
Nuphar advena Aiton	12 - 16	26 - 36	100	91
advena Detroit	12 - 18	32 - 44	100	76
[illegible] Detroit	16 - 24	32 - 44	100	76
polysepalum [illegible]	12 - 14	30 - 40	100	80
luteum [illegible]	12 - 14	18 - 24	100	80
pumilum Timm, Spenn.	6 - 12	12 - 20		
Kalmianum	8	12		

Leitch & Corlies
DRUGGISTS
South West Corner Fifth and Market Streets.

Seeds of Nuphar advena St Louis ~~p~~ pyriform
— — Detroit globose, larger
— varia — — smaller

sinus open
Leaves of N. advena St Louis with fewer distinct ribs
no middle ribs
in lobes
— Detroit, more ribs,
sinus open many minor ones.
in each lobe a
stouter midrib

N. varia — same — —
sinus closed.

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EDWIN R. SWANN & CO.

Apothecaries & Pharmaceutists,
S.W. CORNER OF TWELFTH & OLIVE STS
ST. LOUIS.

Nuphar polysepalum   Coutraye, Oregon
Aug 14 1880
8–10 sepals   15–20 rays of stigma
fl near 4 inches
diamet ; 2–3 exterior sepals
small, green   2–3 superior ones
half yellow   3 or 4 interior
ones quite yellow, sometimes inner
most ones smaller

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cm
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[illegible] 12 [illegible]

[illegible]

1 [illegible]

5 Tue [illegible]

[illegible]

a[illegible] 12/2 [illegible]

[illegible] 6 [illegible]

[illegible]

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MO

Nuphar leaves

Comparing length and breadth.

		length	width	proportion
Nuphar luteum, Frankfurt :				
	"	7.7 :	6.5 inches	100 : 84
	"	7.2 :	6.0 "	100 : 83
	"	6.5 :	4.8 "	100 : 74
N. polysepalum	Rocky Mts			
	Parry	8.5 :	6.6	77
	"	8.4 :	6.8	81
	"	9.3 :	7.3	78
	"	9.0 :	7.3	81
	Hayden	7.0 :	6.0	86
N. advena	St Louis	7.7 :	7.0	91
	"	8.7 :	7.5	86
	Arkansas	4.5 :	4.5	100
	New York	8.5 :	7.7	91
	Texas	9.8	8.5	87
N. Kalmianum				
N. pumilum, Swed.				
N. Spennerianum Germ.				

Nuphar

			lateral nerves from the base	lateral nerves from midrib	
N. luteum	germany	12–14	12	18	18–24
			12	24	
			14	22	
N. pumilum	Sweden	6	6	12	12
			6	12	
N. Spennerianum	Germany	10–12	12	20	16–20
			10	16	
			10	18	
N.? Kalmianum	New York	8	8	12	12
			8	12	
N.? advena	St Louis	12–16	14	26	26–36
			14	28	
	Texas.		12	36	
			16	30	
	Arkansas		14	20	
	New York		16	34	
	Rocky Mountains, Hayden		12	26	
			12	30	
			12	34	
N. ~~pictum~~ polysepalum	Rocky Mts	12–14	12	30	30–40
			12	32	
			12	34	
			12	40	
			14	34	
			14	40	
		6–16			12–40

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN HERBARIUM

0 1 2 3 4 5 6 7 8 9 10
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Nuphar leaves

fr. Detroit, &c Bigelow 1865

minor ribs abundant, not counted

		principal nerves from midrib	from base		proportion of breadth	breadth	length inches
N. advena · Detroit. Bathhouse Marsh.		36.	12		72	6.5	9.0
		40	16		88	7.4	8.4
		40	14		73	6.8	9.3
		32.	14		80	5.8	7.2
	32 – 44	36	16	79	75	6.8	9.0
	12 – 18	40	14		76	7.2	9.5
		30	14		86	6.0	7.0
		44	14		85	8.6	10.1
32 – 44		44	18	76	78	8.0	10.2
12 – 18 Mays Creek		38.	16		70	6.8	9.7
		38	16		72	7.8	10.8
	34 – 38	38	16	72	67	6.0	9.0
	14 – 16	34	14		73	6.4	8.8
		38	16		77	7.3	9.4
N. bicolor s. angust. Bloody Run.		42	24		73	8.0	11.0
		44	24		73	8.0	11.0
	32 – 44 16 – 24	36.	18	73	72	6.5	9.0
		32	16		75	7.6	9.3
Grand Marais		40	18		75	6.8	9.0
		40	18		70	7.0	10.0
32 – 44	36 – 44 18 – 22	36	20	76 75	76	8.4	11.0
16 – 24		36	22		82	9.0	11.0
		44	20		71	9.0	12.6
Belle Isle		40	24		84	7.6	9.0
		32	16		78	5.8	7.4
	32 – 40 16 – 24	36	20	81	80	5.8	7.2
		38	20		82	6.7	8.2

10-42a

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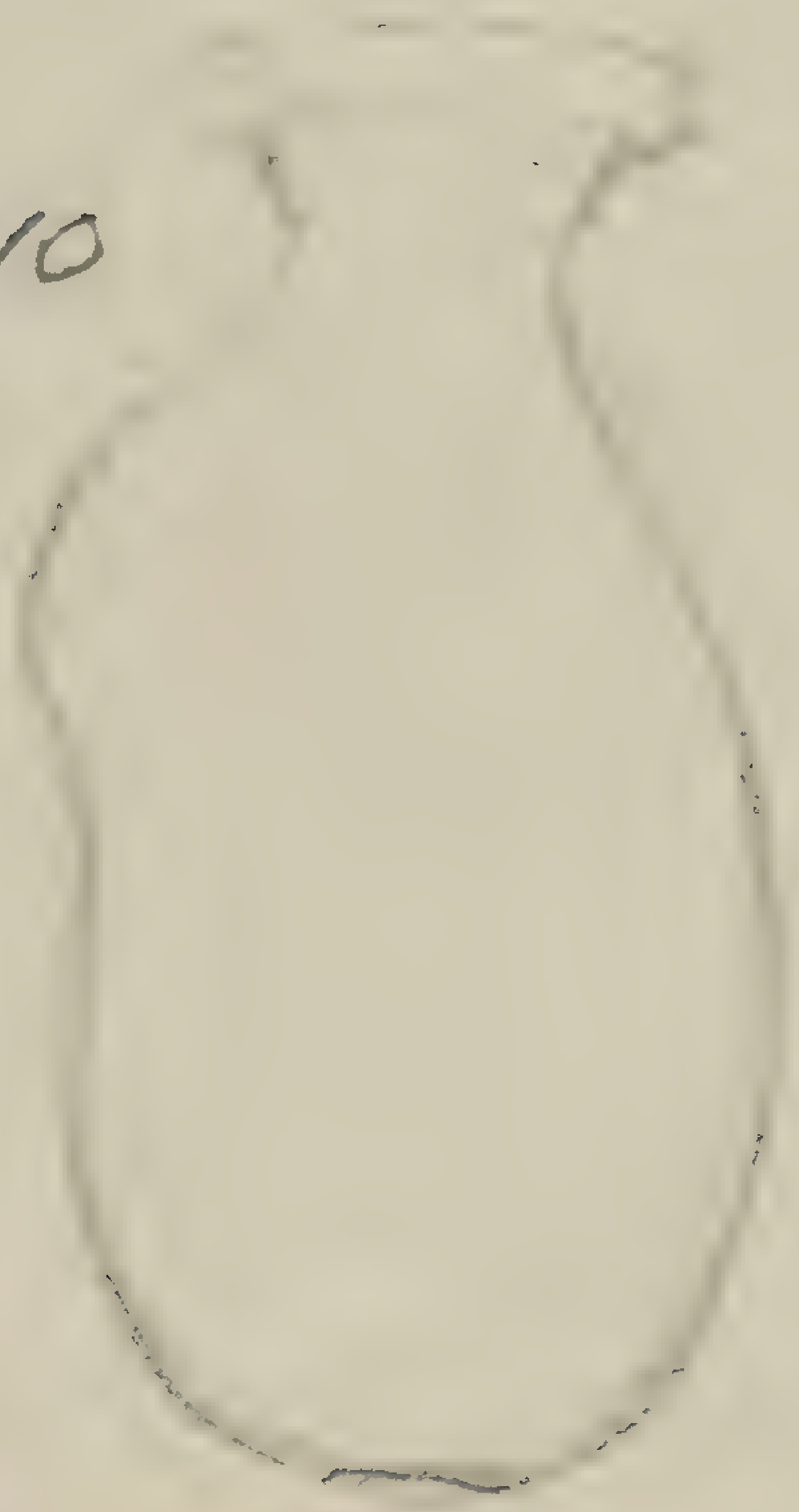
cm copyright reserved MO

x10

Jy 24 1864

x10



53

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CHEMIST
A

EX. LEITCH,
HECARY & CHEMIST,
h and Olive Sts., St. Louis.

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43-4

Nuphar

IV. *Direction of Winds and number of Thunderstorms in '61 & '62.*

1861.	E.	N.	N.E.	S.W.	N.W.	S.	W.	S.E.	Prevailing Winds.	Thunder-storms.
January	11	3	12	22	38	18	28	61	S.E.	0
February	4	2	2	35	24	19	41	60	S.E.	2
March	12	11	10	23	30	19	42	40	W. & S.E.	3
April	16	10	9	26	21	35	34	26	S. & W.	2
May	26	10	23	21	8	13	49	35	W. & S.E.	5
June	12	21	22	20	25	26	8	41	S.E.	7
July	3	31	14	21	26	46	15	29	S.	3
August	18	24	58	17	11	18	3	37	N.E.	5
September	6	14	18	26	30	13	21	52	S.E. & N.W.	3
October	12	9	5	21	30	33	30	46	S.E. & S.	1
November	7	15	8	22	27	20	36	44	S.E. & W.	1
December	9	19	9	25	23	33	17	51	S.E. & S.	0
	136	169	190	279	293	293	324	522	S.E.	32

1862.	E.	S.W.	N.	N.E.	W.	S.	N.W.	S.E.	Prevailing Winds.	Th. st's.
Jan.	19	6	19	23	29	3	38	51	S.E.	1
Feb.	14	9	18	16	22	7	39	43	S.E. & N.W.	0
March	9	14	3	15	59	10	34	43	W., S.E. & N.W.	4
April	12	13	18	31	18	11	34	47	S.E., N.W. & N.E.	6
May	12	18	14	38	18	30	14	44	S.E. & N.E.	5
June	3	29	24	16	8	36	26	23	S., S.W., N.W., N. & S.E.	6
July	5	25	17	7	2	24	31	77	S.E.	10
August	6	16	16	45	5	22	28	48	S.E. & N.E.	7
Sept.	16	10	21	18	11	18	13	72	S.E.	6
Oct.	1	15	19	4	10	40	47	46	N.W. & S.E.	1
Nov.	14	19	21	12	43	19	34	18	W. & N.W.	0
Dec.	11	17	21	5	34	45	13	38	S., S.E. & W.	4
	112	191	211	230	259	265	351	550	S.E.	50

V. *Positive or Negative Electricity in the Observations of '61 & '62.*

	Positive Electricity.		Negative Electricity.		No Electricity, or 0.		Highest Positive Electricity.	
	1861.	1862.	1861.	1862.	1861.	1862.	1861.	1862.
Jan.	179	179	3	5		2	40°	40°
Feb.	162	166	6	2			34	33
March	168	179	15	8			30	48
April	157	157	12	22	1	1	33	52
May	171	180	17	5	1	3	25	32
June	162	143	5	2	8	20	16	21
July	183	153	3	8	1	24	14	11
August	176	143	5	4	6	40	15	19
Sept.	169	117	1	1	10	61	18	23
Oct.	162	143	4	3	20	41	33	35
Nov.	172	157	2	7	6	16	42	42
Dec.	175	166	5	0	6	17	37	35
	2046	1883	78	67	59	225	42°	52°

Additional Remarks on ATMOSPHERIC ELECTRICITY.

By A. WISLIZENUS, M.D.

The delay in the publication of this volume enables me to add to my observations of atmospheric electricity in 1861, the result of my observations in 1862. The latter observations have been made in the same manner and by means of the same fine glass thread, which, after many thousand torsions, proves as good as ever. I present herewith in tabular form the general result of my observations in 1861 and 1862.

I. *Monthly mean of Positive Atmospheric Electricity in* 1861 *and* 1862, *at St. Louis, Mo., based upon daily observations at* 6, 9, 12, 3, 6 *and* 9 *o'clock, from morning till night.*

	Jan.	Feb.	Mar.	Ap'l.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean of Year.
1861*	16.5	12.1	9.8	8.8	7.8	4.0	3.7	3.4	3.0	7.1	10.0	14.3	8.4
1862	12.1	16.0	9.4	10.6	7.5	3.0	2.2	2.3	3.0	7.7	12.6	13.9	8.4

* This table of 1861 differs in some decimals from that published on page 66 and in Diagram No. 1. Having discovered some errors, I calculated all my observations once more, and give now the present as the corrected table.

II. *Monthly mean of Temperature and of Relative Humidity in* 1861 *and* 1862, *at St. Louis, Mo., based upon daily observations, cotemporaneous with those of Atmospheric Electricity.*

TEMPERATURE.

	Jan.	Feb.	Mar.	Ap'l.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean of Year.
1861	32.2	40.4	44.8	58.1	64.1	76.9	77.5	78.6	69.1	57.9	46.0	39.7	57.1°F.
1862	28.9	30.2	43.2	55.0	69.7	75.1	81.2	80.7	72.1	57.3	42.6	41.3	56.4°F.

RELATIVE HUMIDITY.

	Jan.	Feb.	Mar.	Ap'l.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean of Year.
1861	72.2	63.3	64.5	61.5	66.3	70.8	66.3	69.6	77.3	76.6	69.0	74.3	69.5
1862	85.3	73.9	70.8	67.0	57.3	67.0	66.8	64.3	74.2	67.2	69.5	74.6	69.8

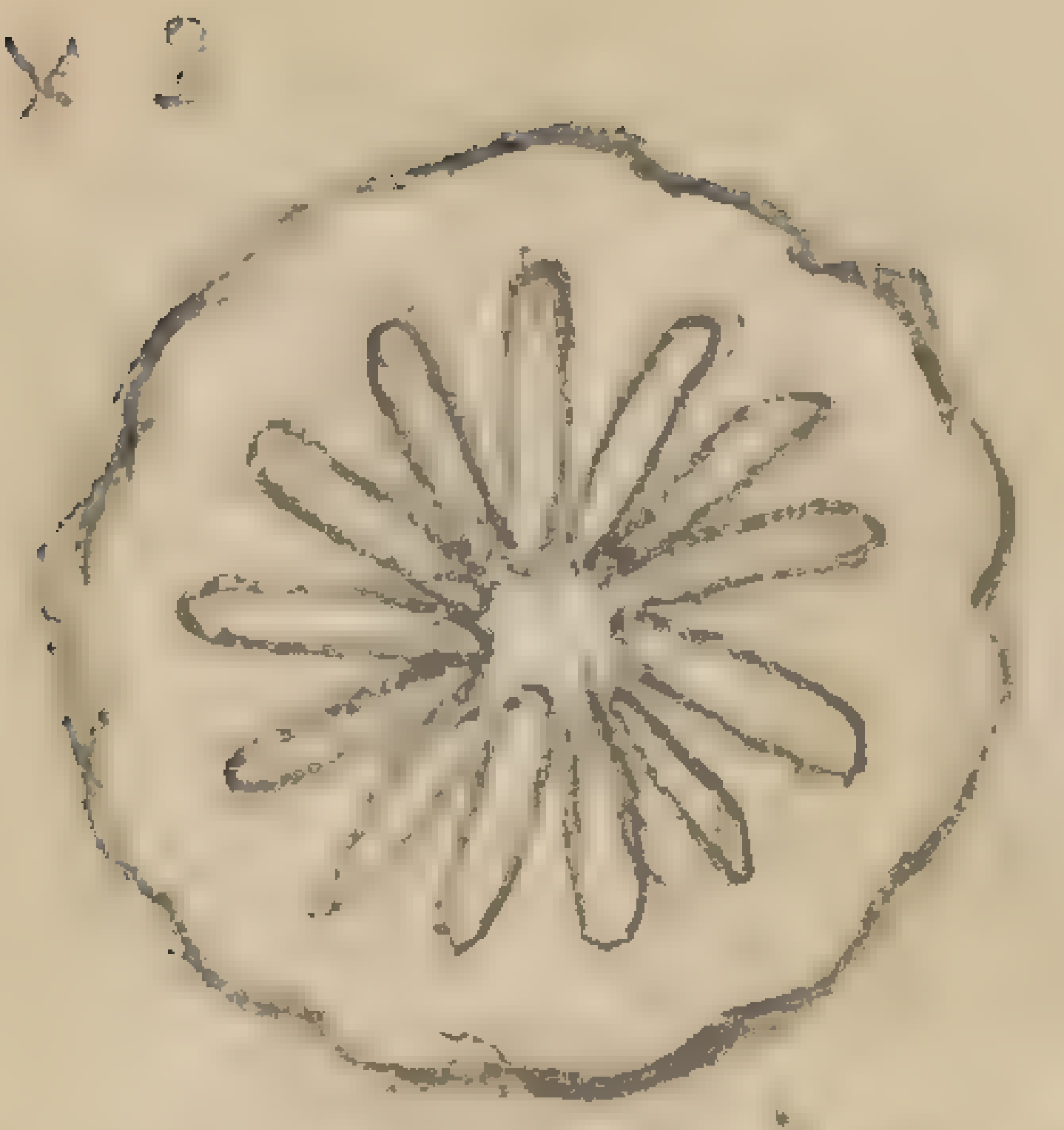
III. *Yearly mean of Positive Electricity of Temperature, and of Relative Humidity of the Atmosphere, at the hours of* 6, 9, 12, 3, 6 *and* 9, *from morning till night, based upon daily observations at these hours through the years* 1861 *and* 1862, *at St. Louis, Mo.*

ELECTRICITY.

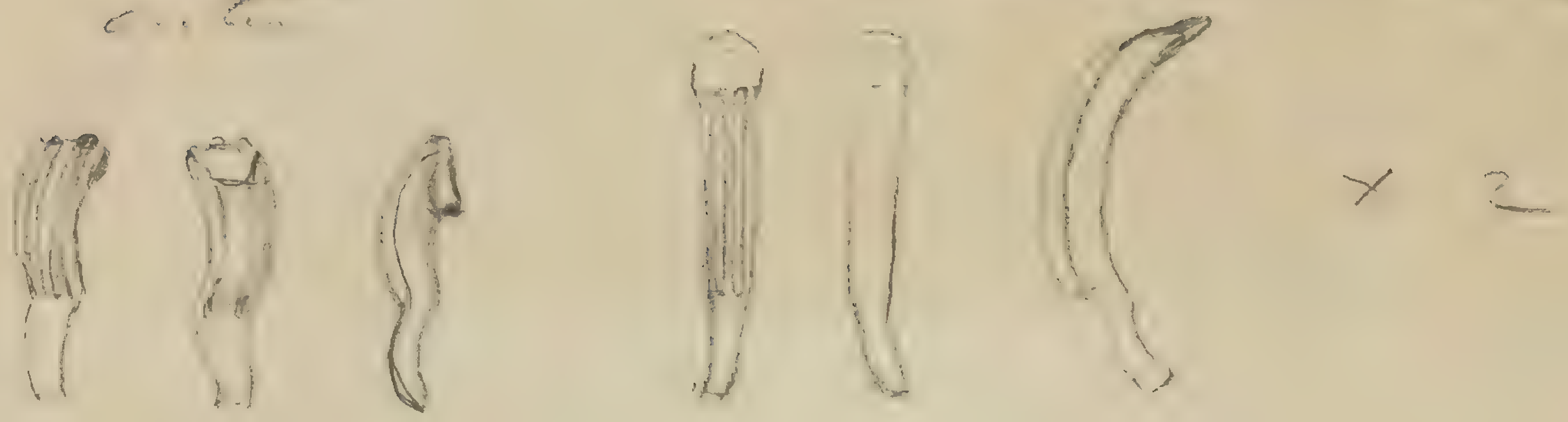
	At 6 A.M.	At 9 A.M.	At 12 M.	At 3 P.M.	At 6 P.M.	At 9 P.M.
1861	8.6	10.0	9.2	7.9	8.7	6.9
1862	8.9	10.0	9.1	7.3	8.1	6.8
TEMPERATURE.						
1861	48.9° F.	54.9	61.6	63.6	59.3	54.3
1862	48.9	55.0	60.9	62.3	58.0	53.6
RELATIVE HUMIDITY.						
1861	86.4	71.3	60.3	57.2	65.1	77.3
1862	85.3	70.6	60.0	57.5	67.6	78.0

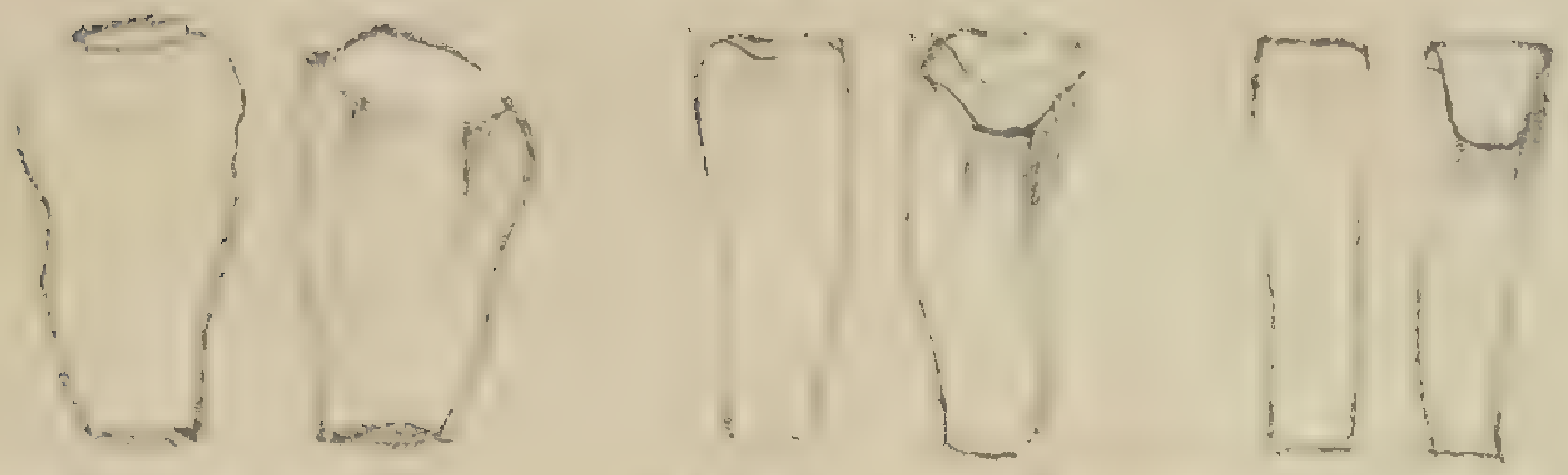
Nuphar Dec 27 1865

May Creek, Detroit, Bigelow 1865



margin crenate
undulate


outer
inner stamens x 2
x 2


upper side
upper inside side

79

petals x 2
upper part of petal brown red
under surface [illegible] yellow [illegible]
upper [illegible]

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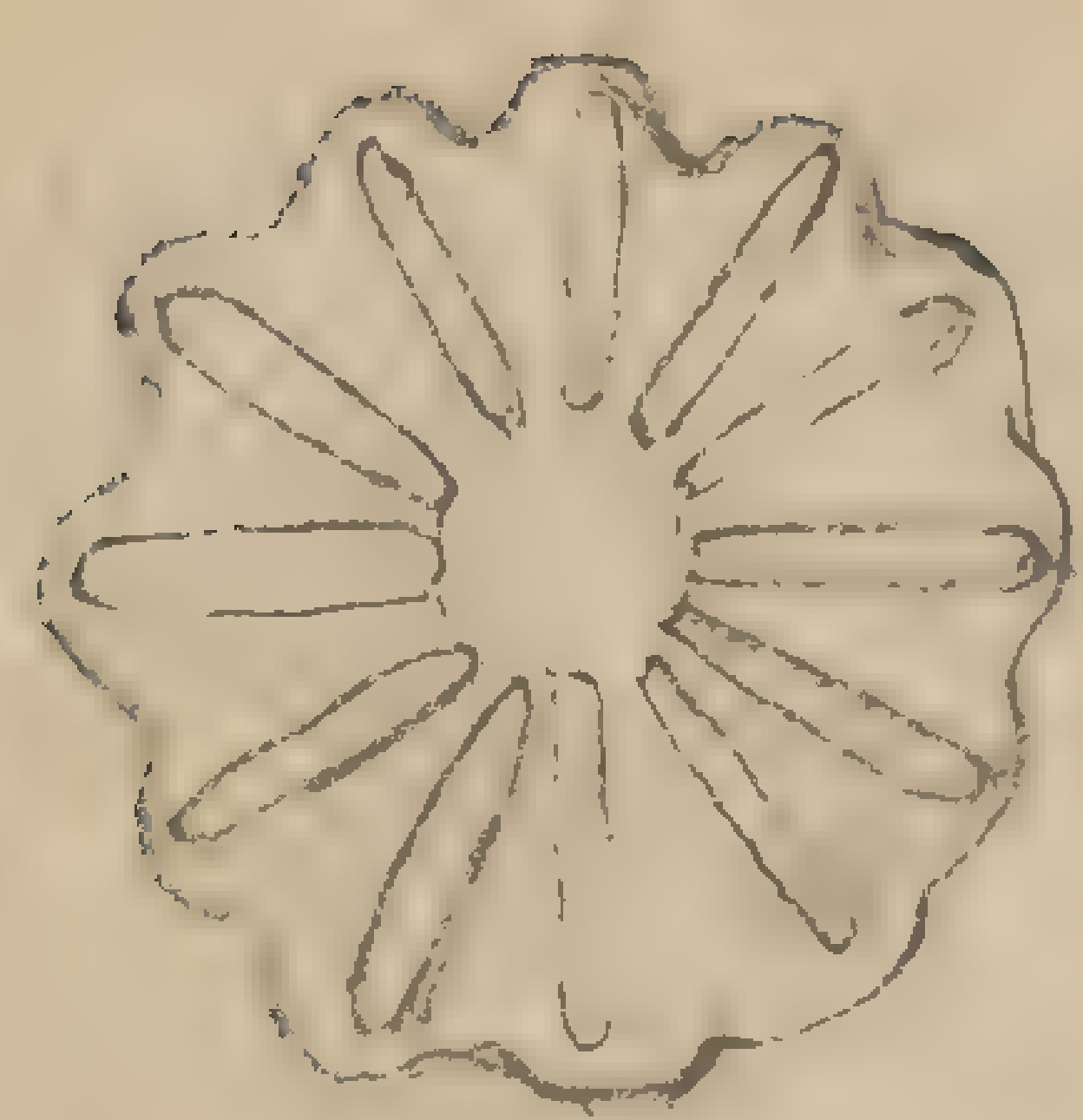
MO

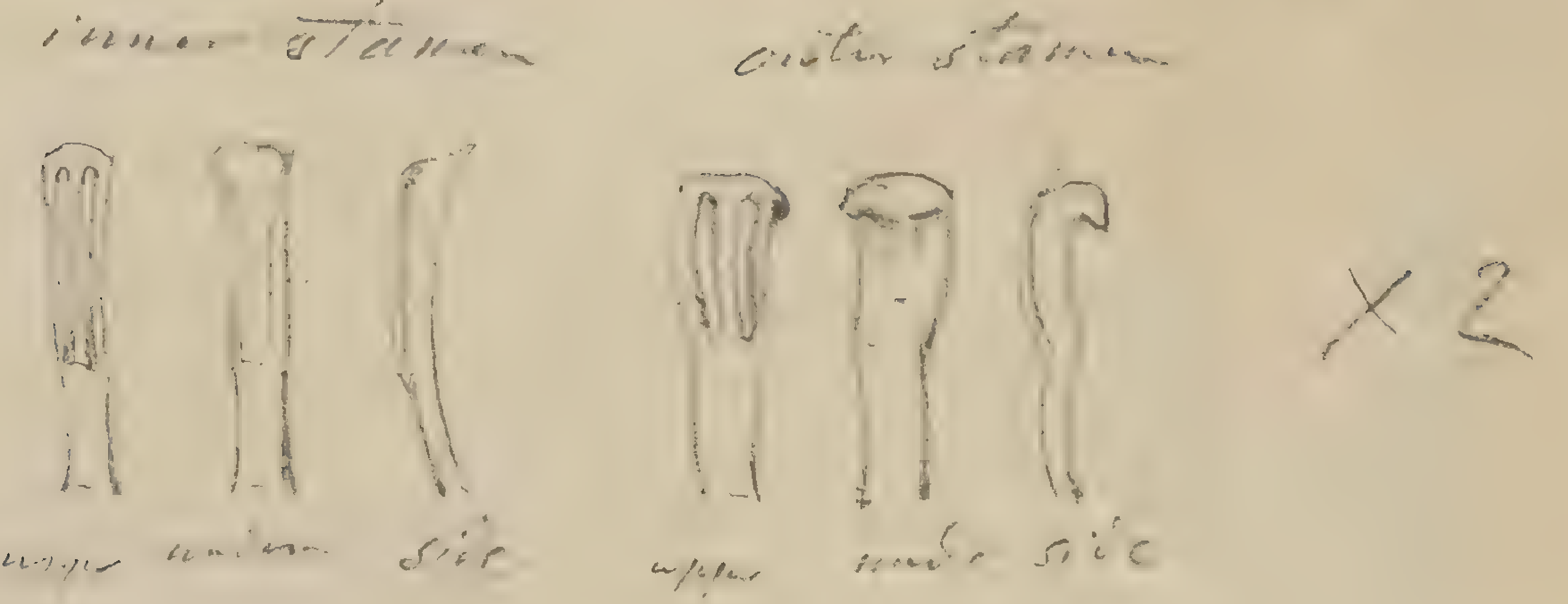
ALEX. LEITCH,
APOTHECARY & PHARMACEUTIST,
COR. 4TH & OLIVE STS., ST. LOUIS.

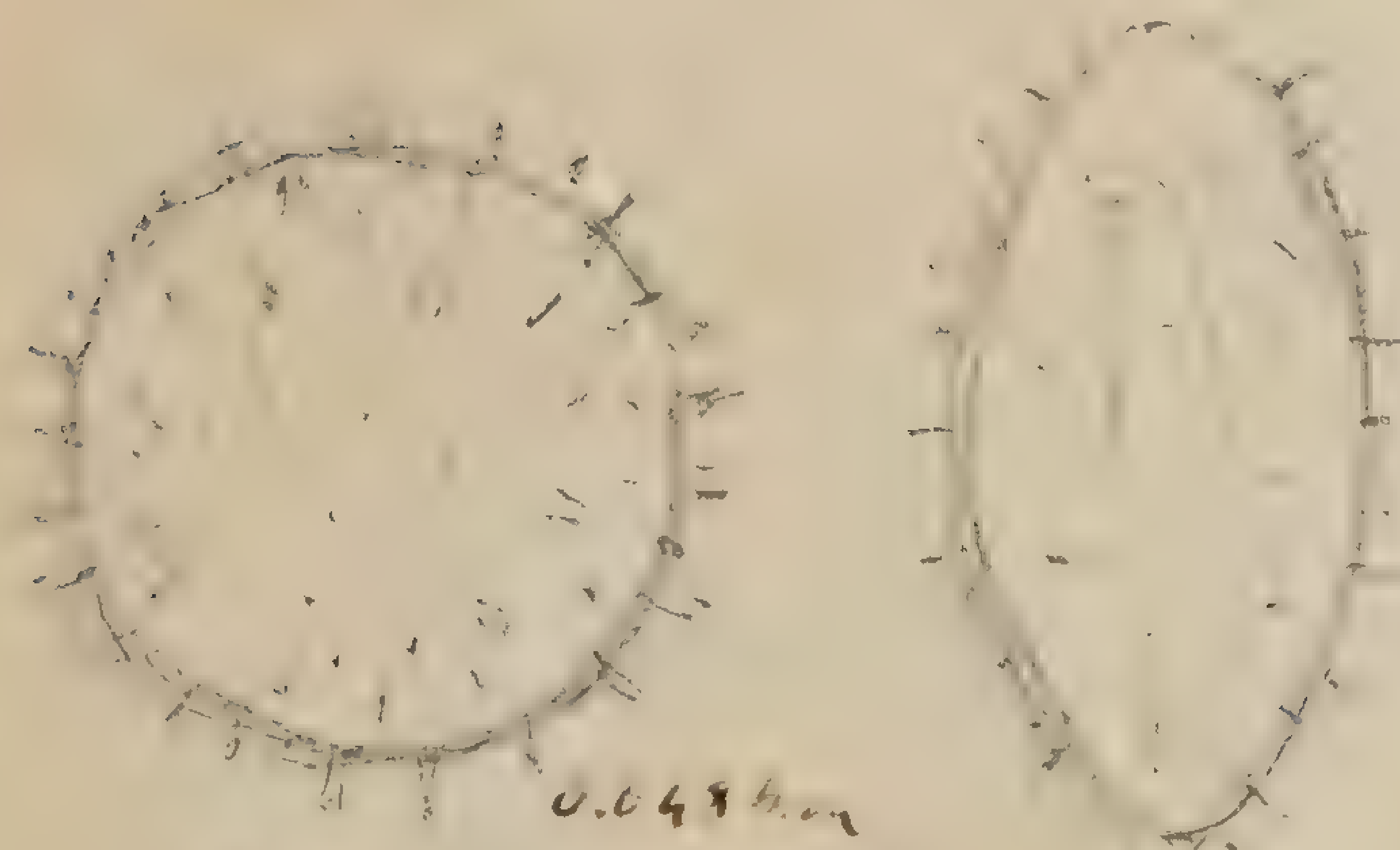
Nuphar   Dec 25 1865

Belle Isle Detroit Dr Bigelow

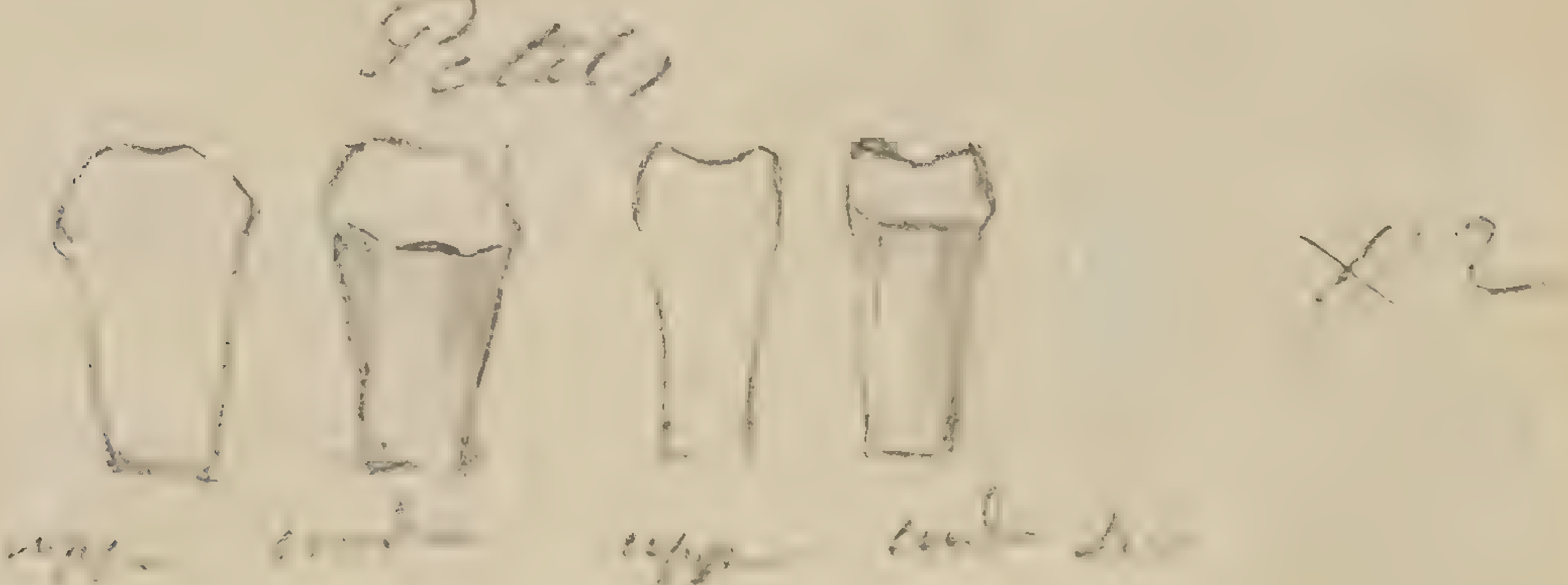


Stigma × 2


inner stamen
outer stamen
upper
under
side
upper
under
side
× 2



Pollen × 675   [illegible]
well marked [illegible]
[illegible] abundantly, but
[illegible]


Petals
upper
under
upper
under side
× 2

upper part of outside
smooth and apparently glandular

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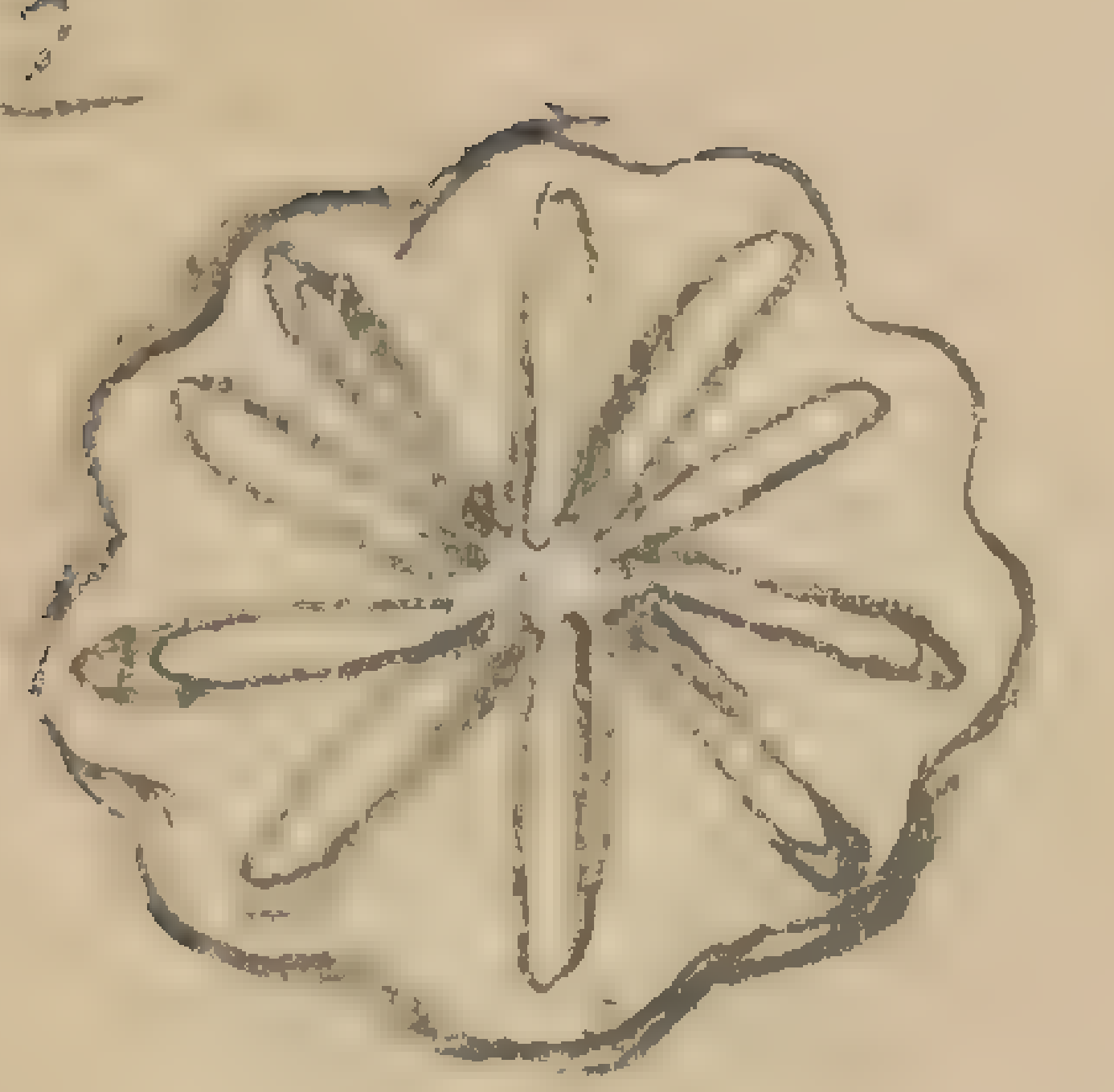
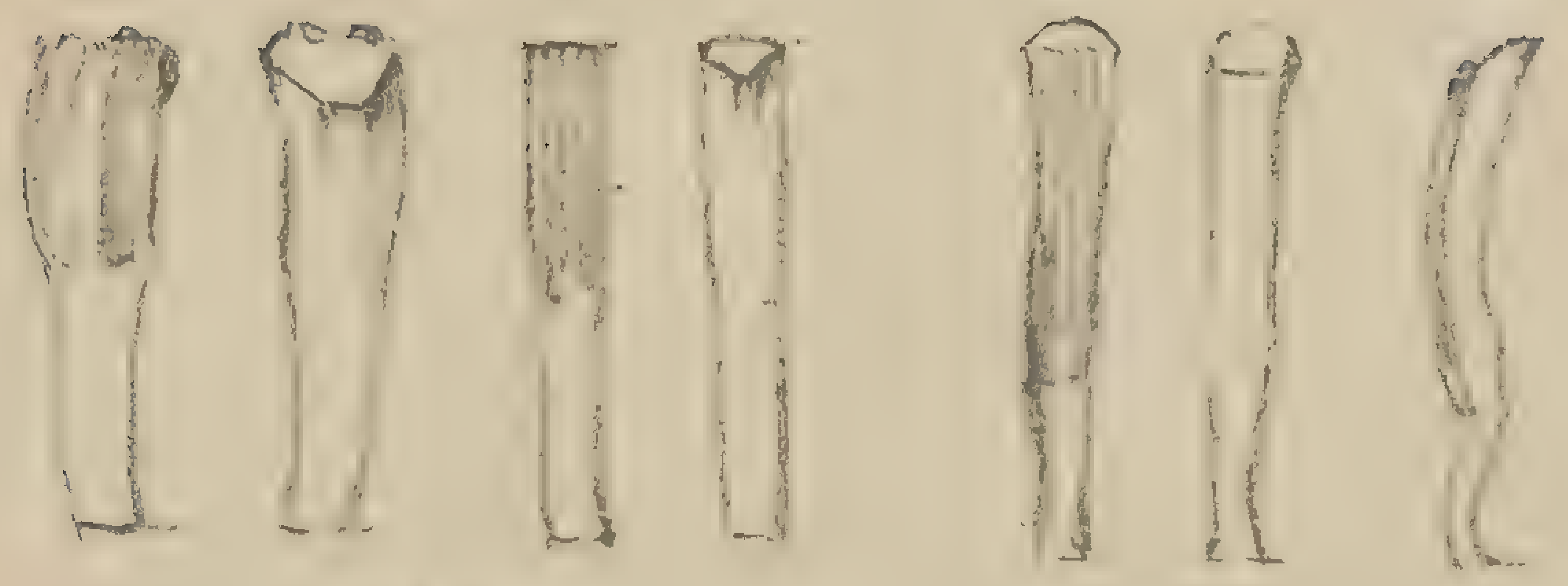
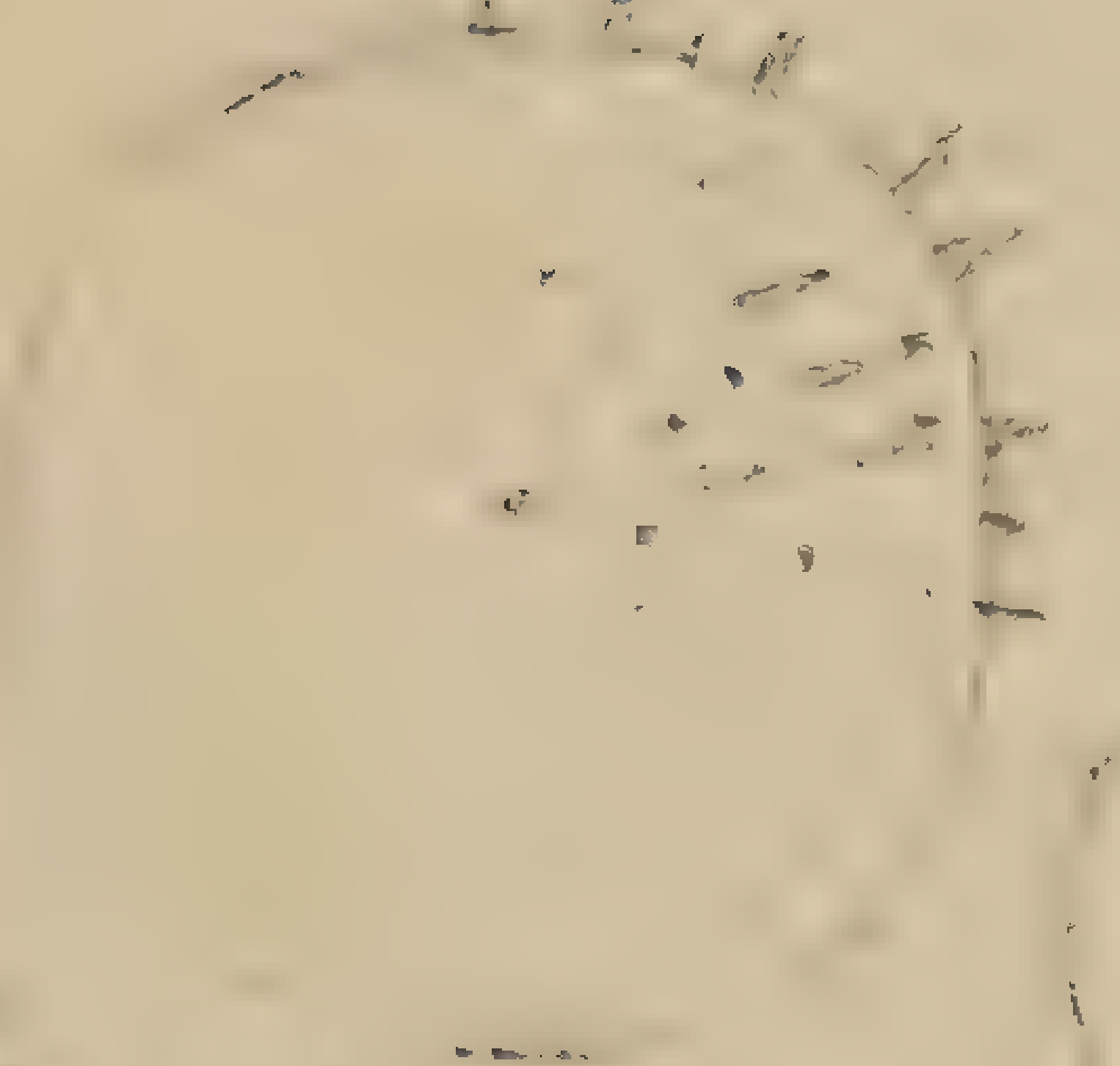
Nuphar Dec 27 1865

Bixby sun Dr Bigelow

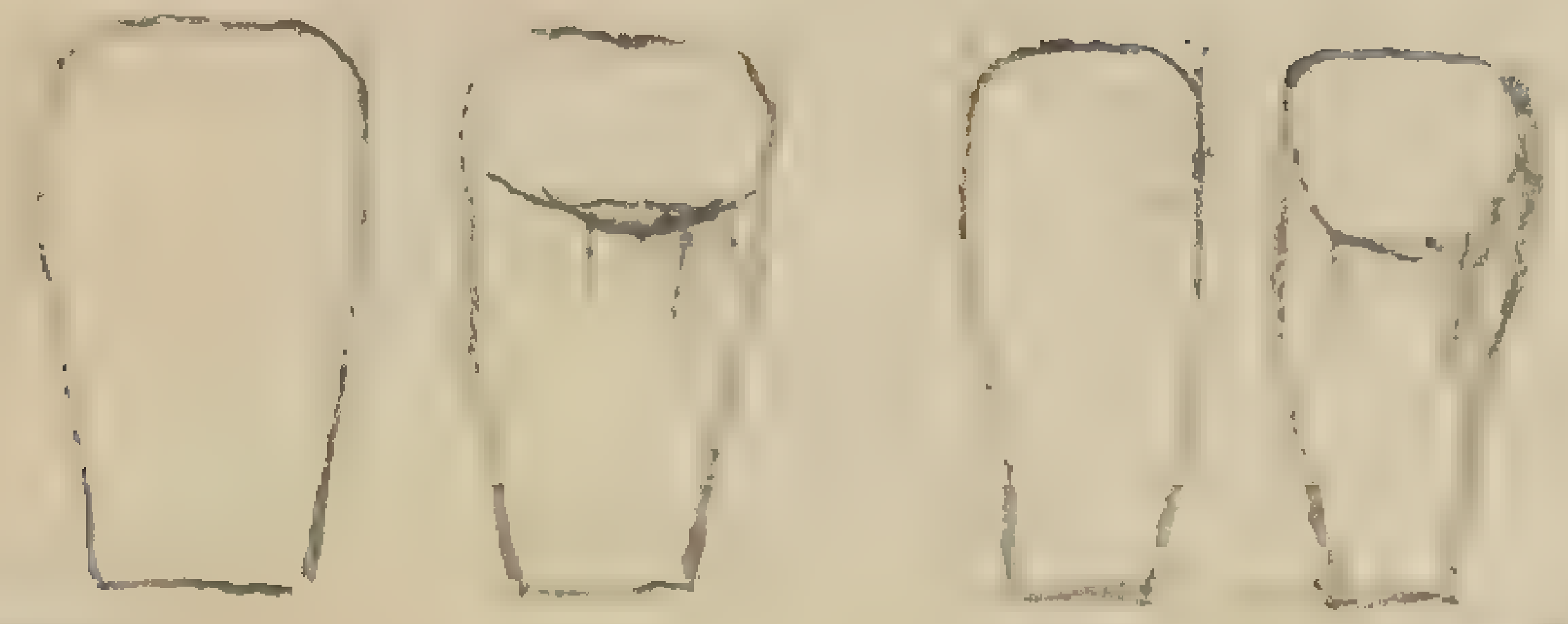



outer
inner stamens × 2

89



Pollen × 45


upper
under

petals × 2

Stam. & petals tinged with purple

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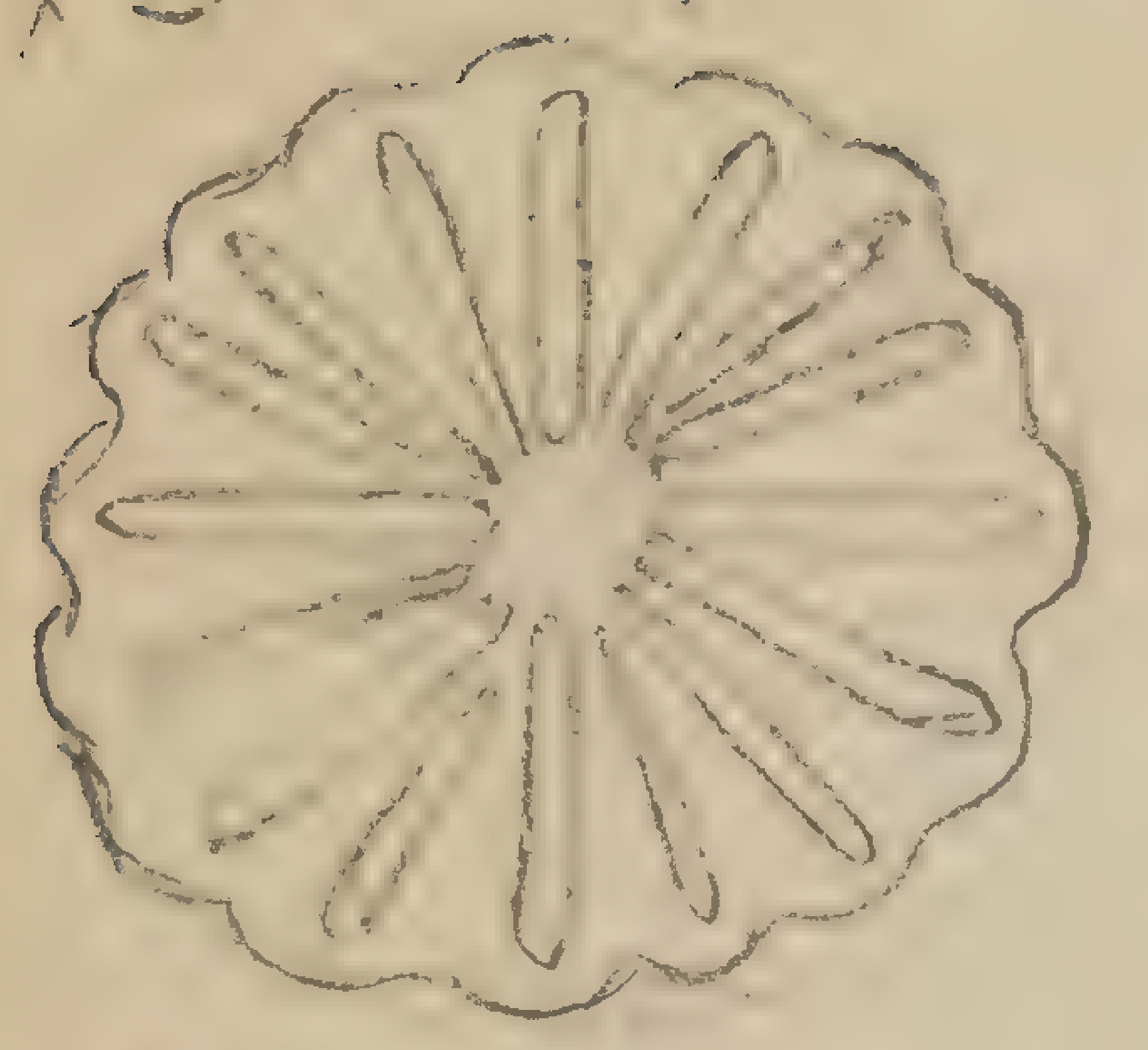
Nuphar

Dec 26 1865

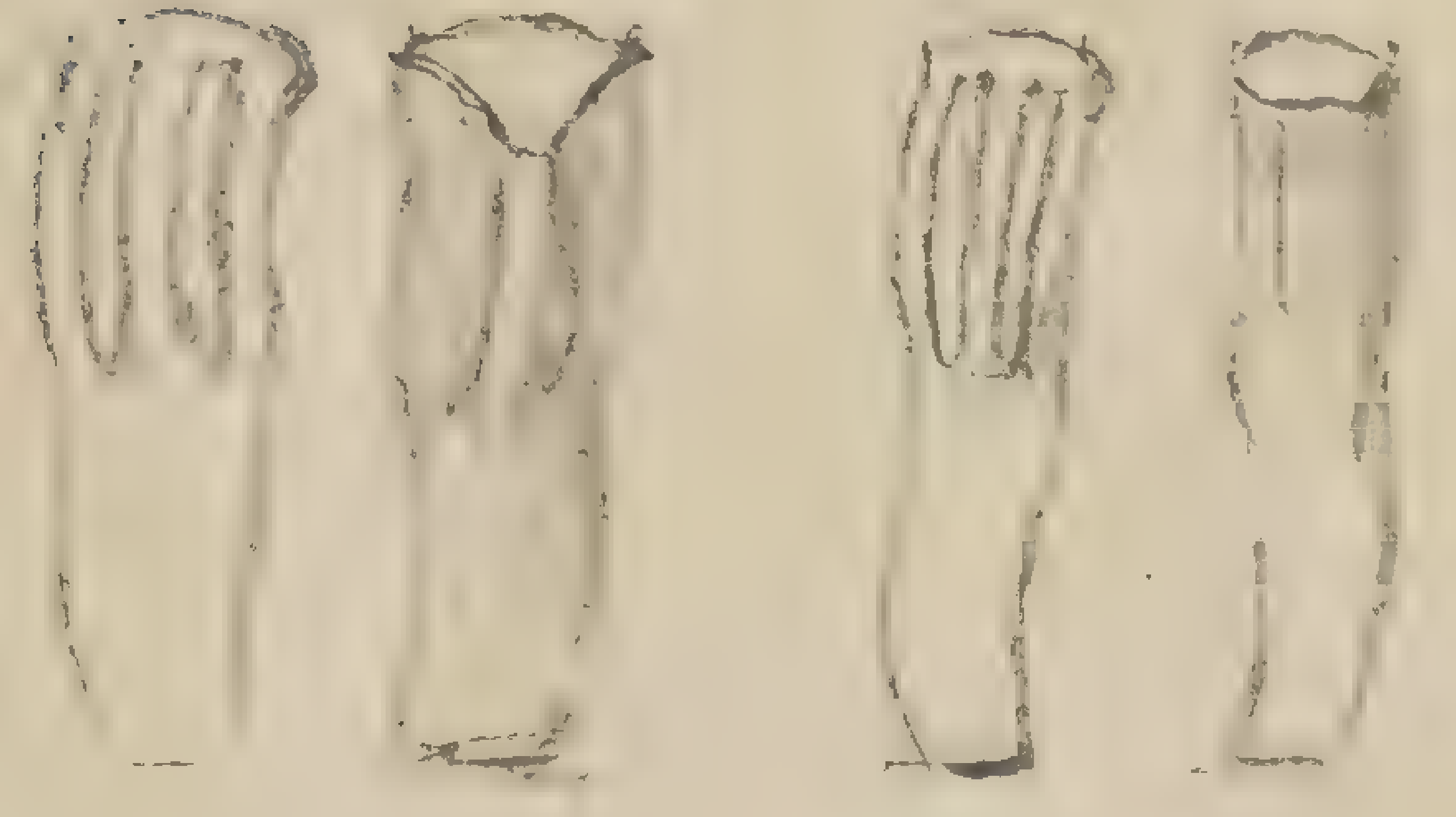
Grand Marais, Detroit, Bigelow July 1865

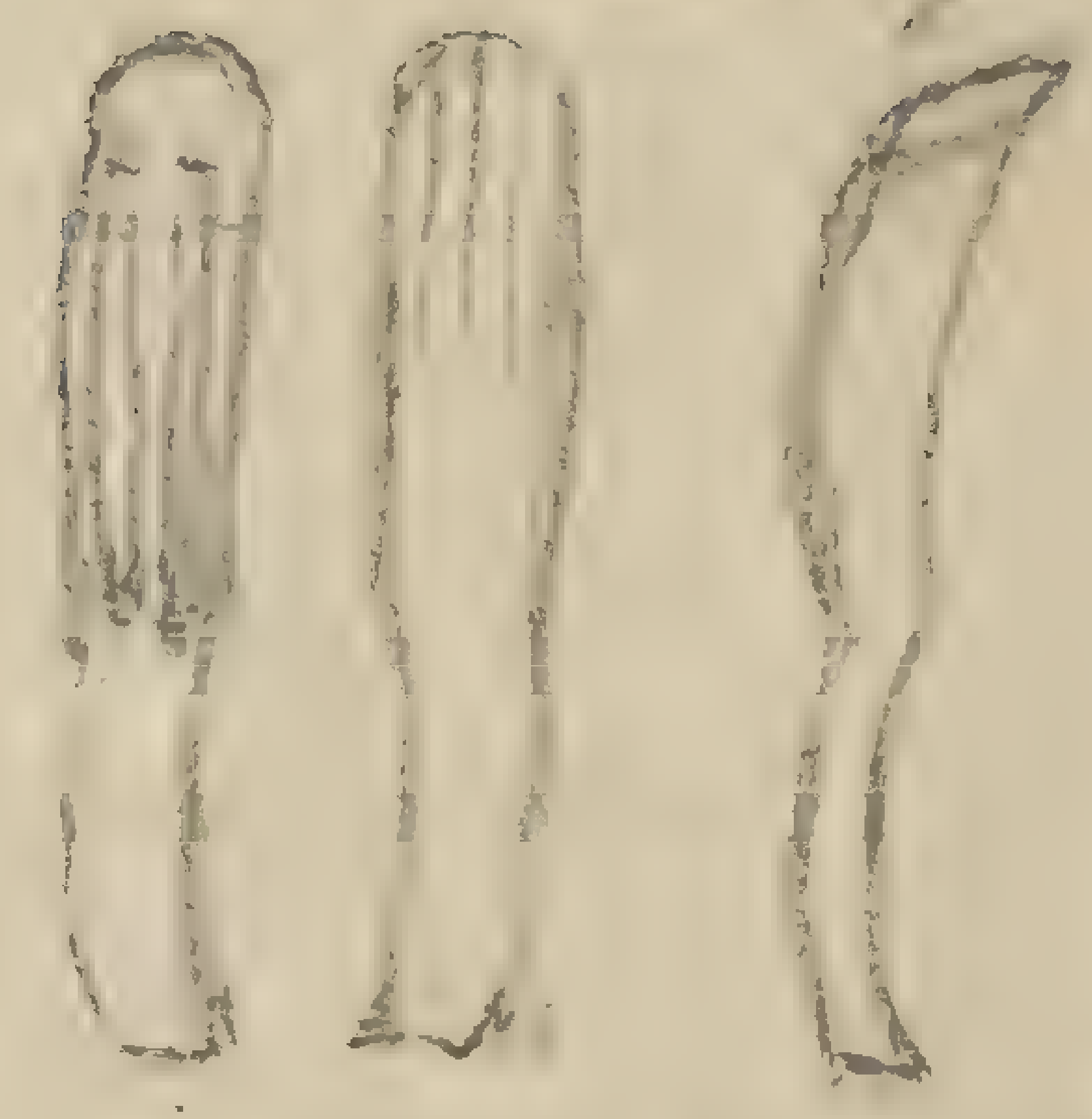
x 2



Stigma

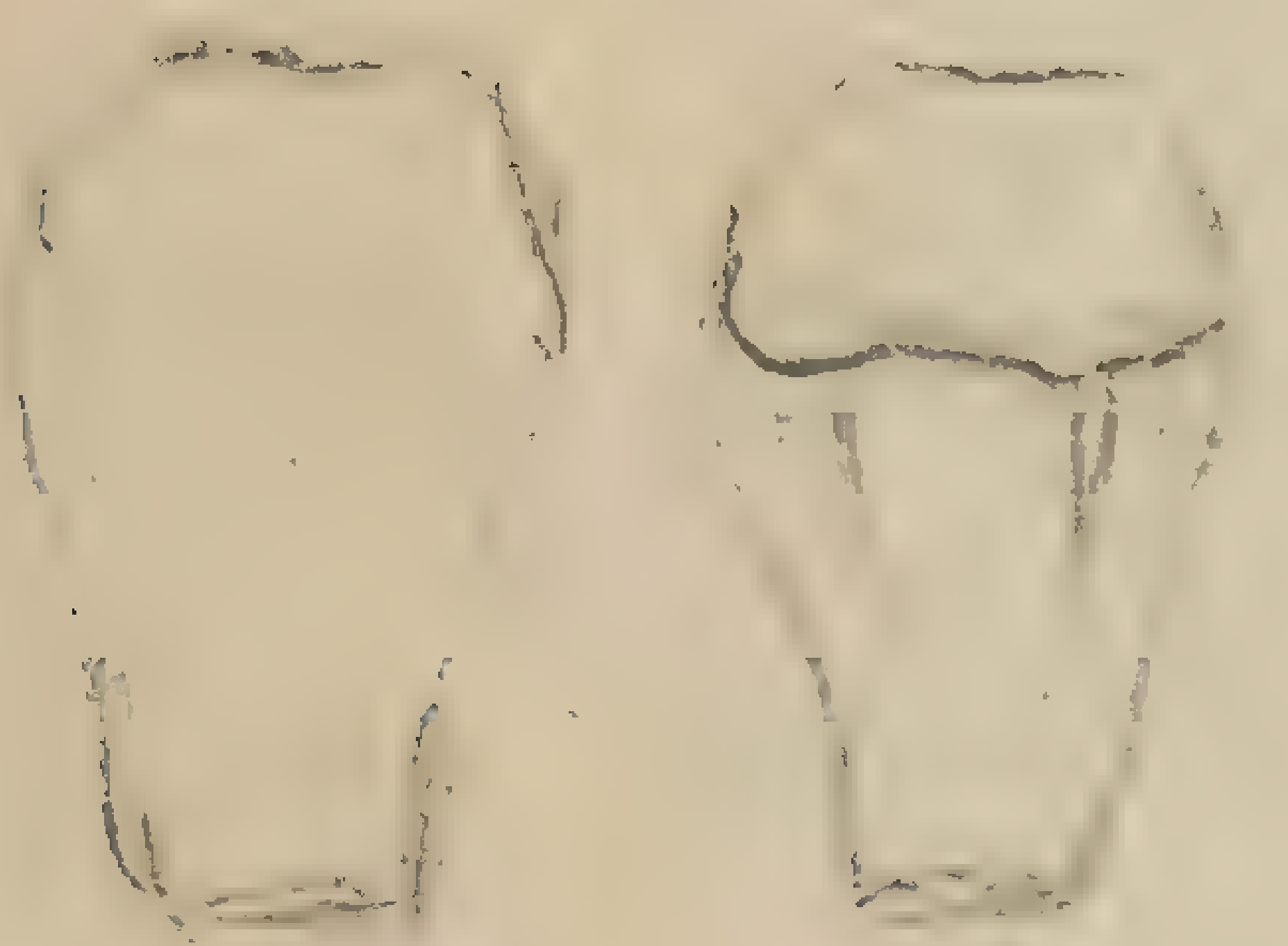
outer stamens x 2



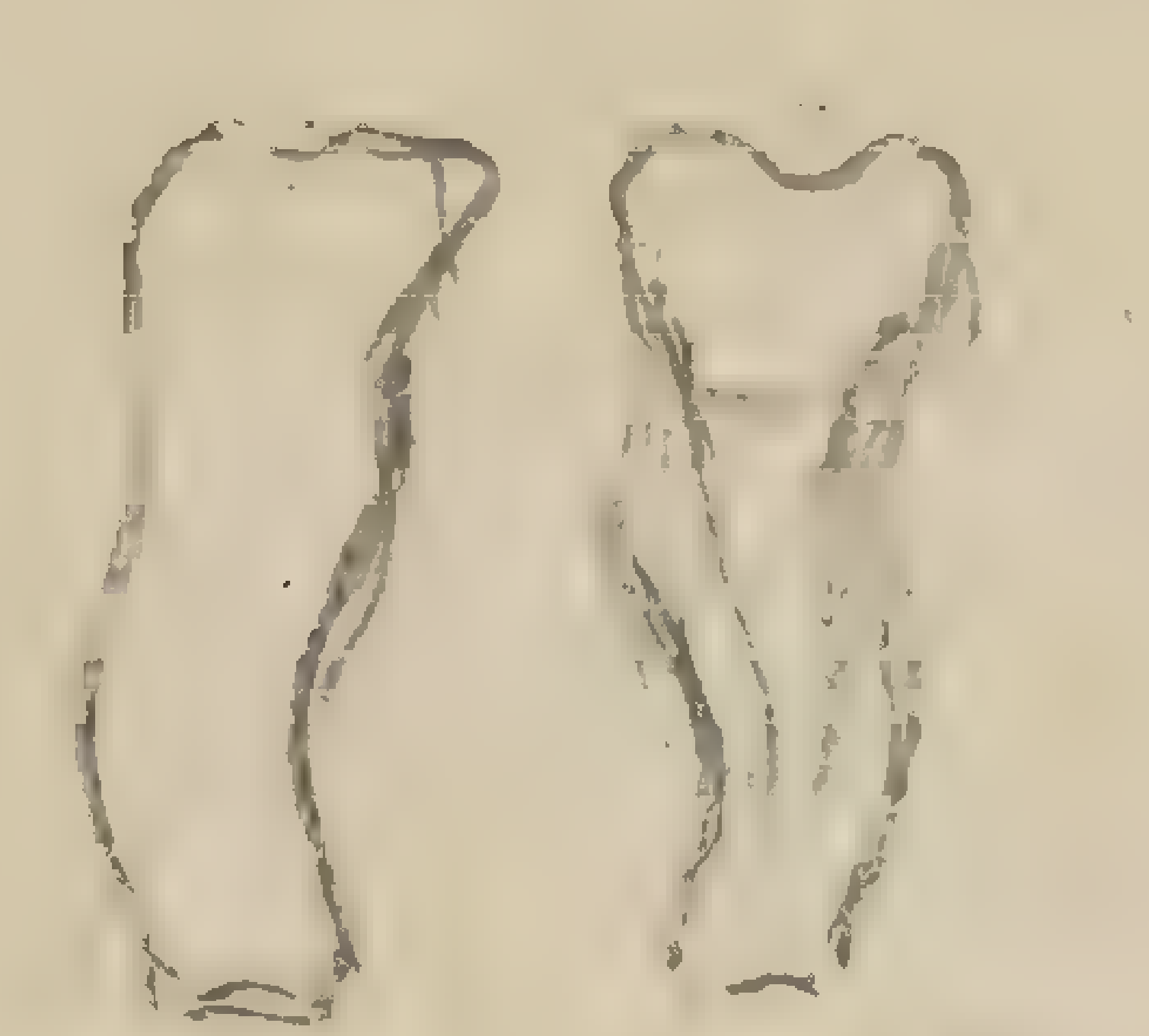


innermost stamen x 2

tip of Connective and upper part of filament (below anther) apparently red



upper under



upper under

90

Petal x 2

upper part of petal (especially glandular dorsal part) yellow. middle of petal red apparently much like the Corolla petal of Cambridge June 15th 1865

Alex. Leitch,

APOTHECARY & PHARMACEUTIST,

COR. 4TH & OLIVE STS., ST. LOUIS.

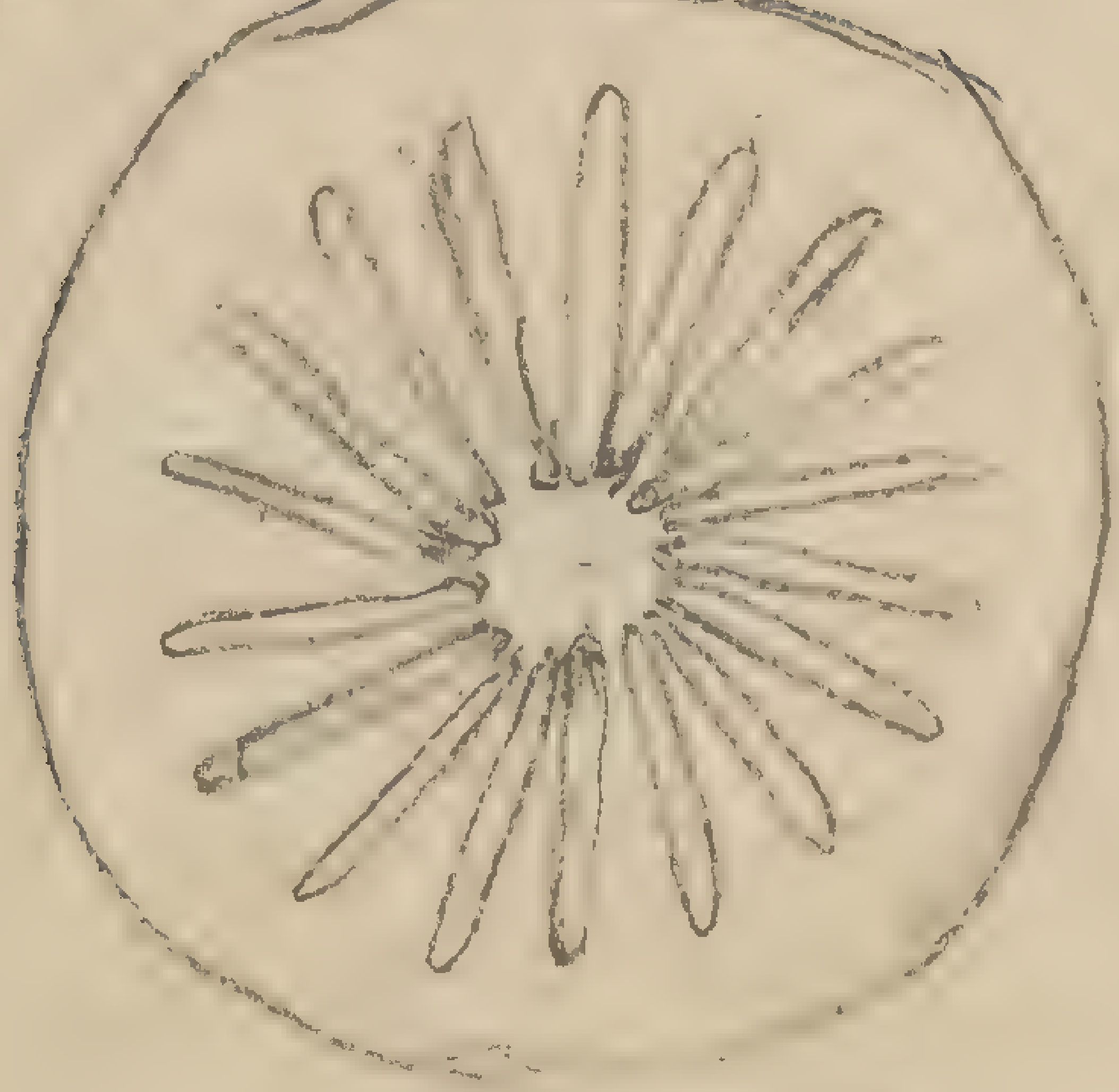
Nuphar

Oct 27 186

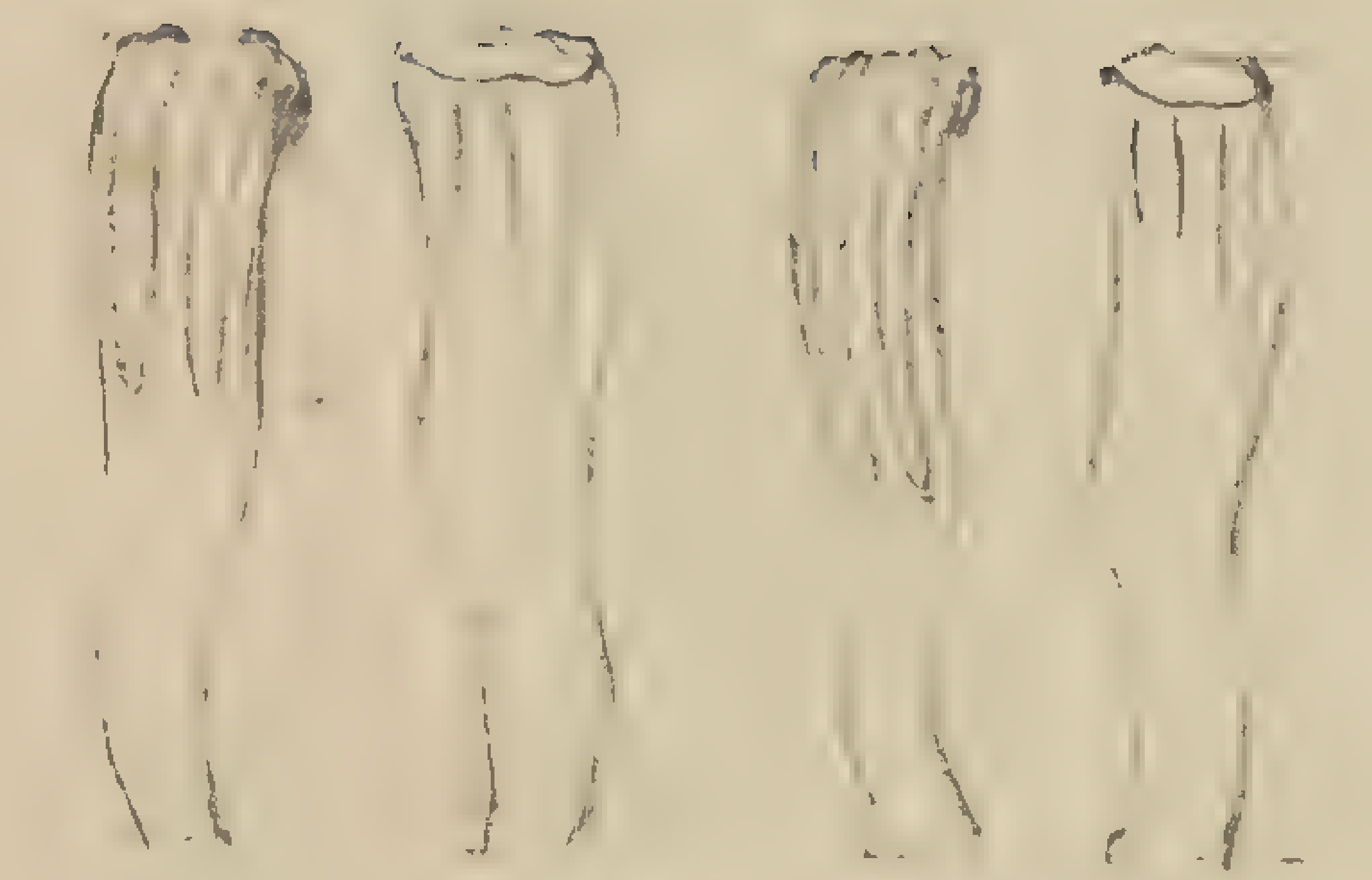
Parkhouse Marsh, Detroit

Dr Bigelow

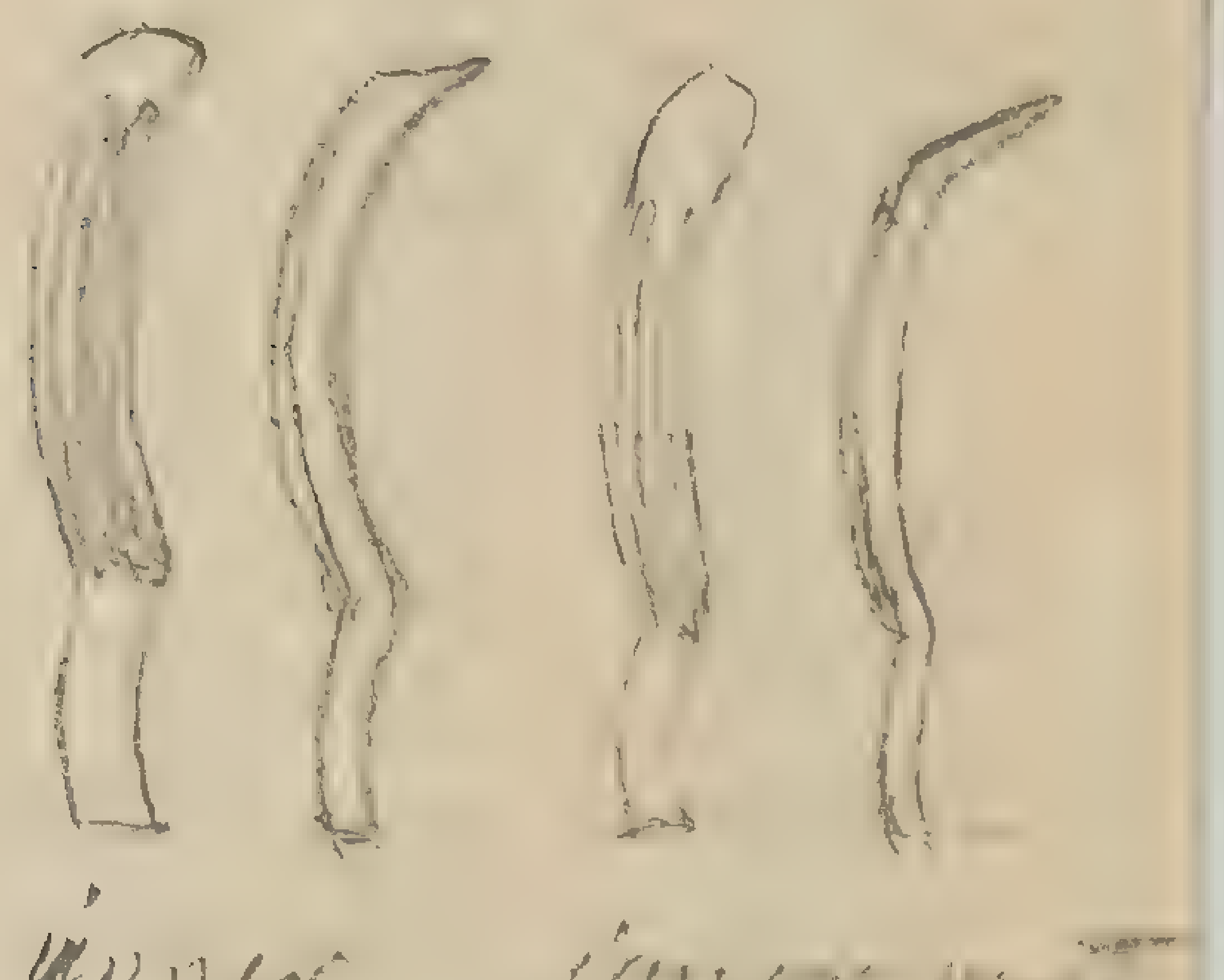
Stigma × 2



margin entire

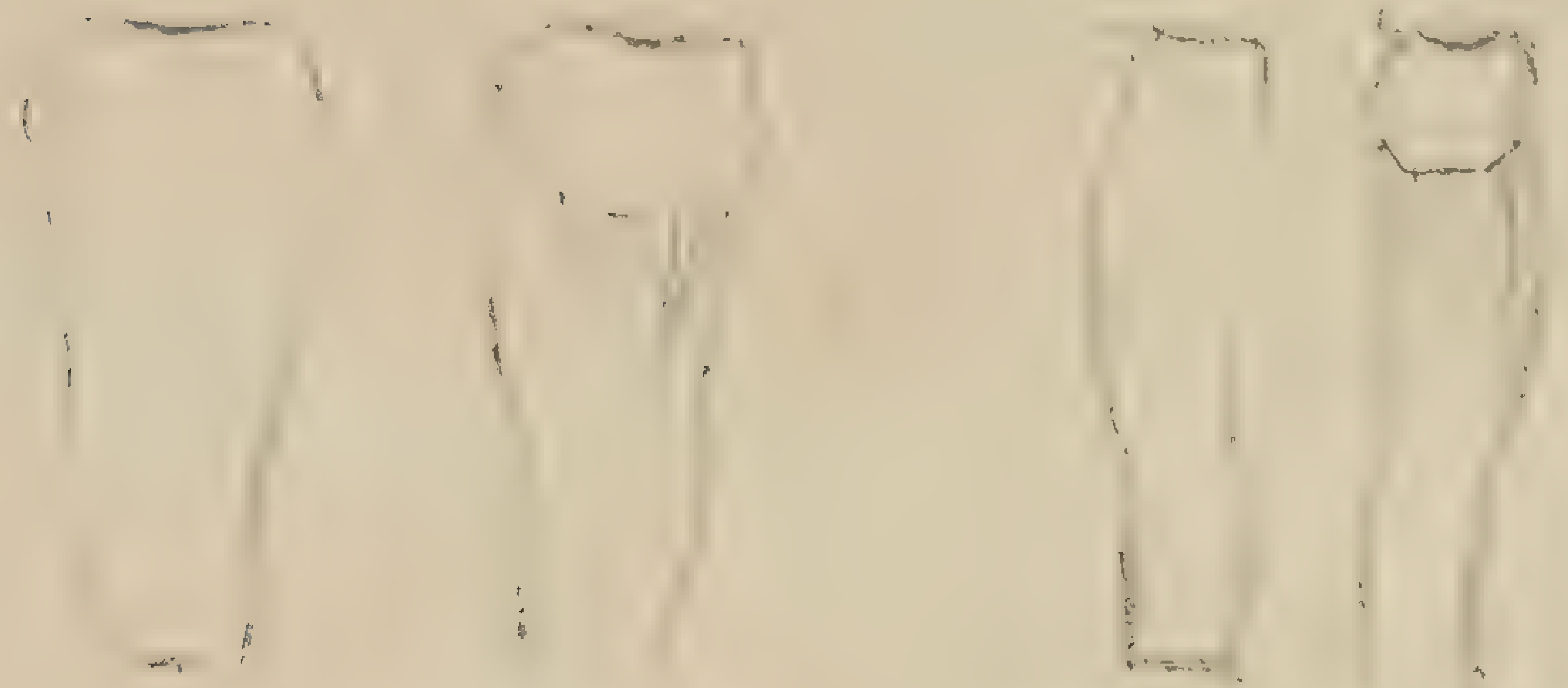


outer stamens × 2



inner sta.

inner most stamens, with very long anthers



upper inner upper under

Petals, × 2

upper part of petal red, the under parts paler

The smooth glandular surface which on the petals and outer stamens, appears on the back, is turned inside in the inner stamens.

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ALEX. LEITCH,

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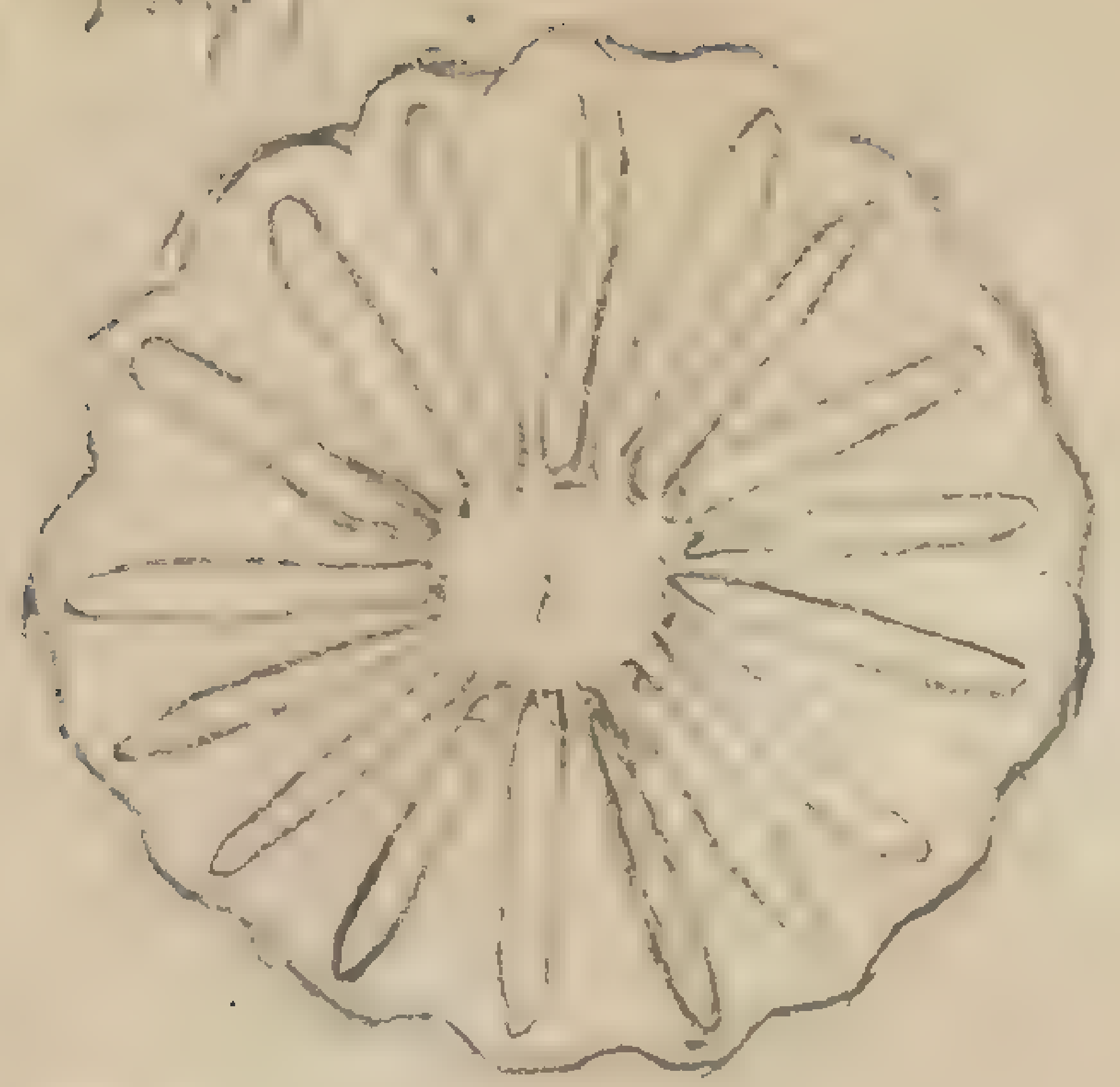
Napoleona Dec 29 1865

Grand Bassam Bigelow

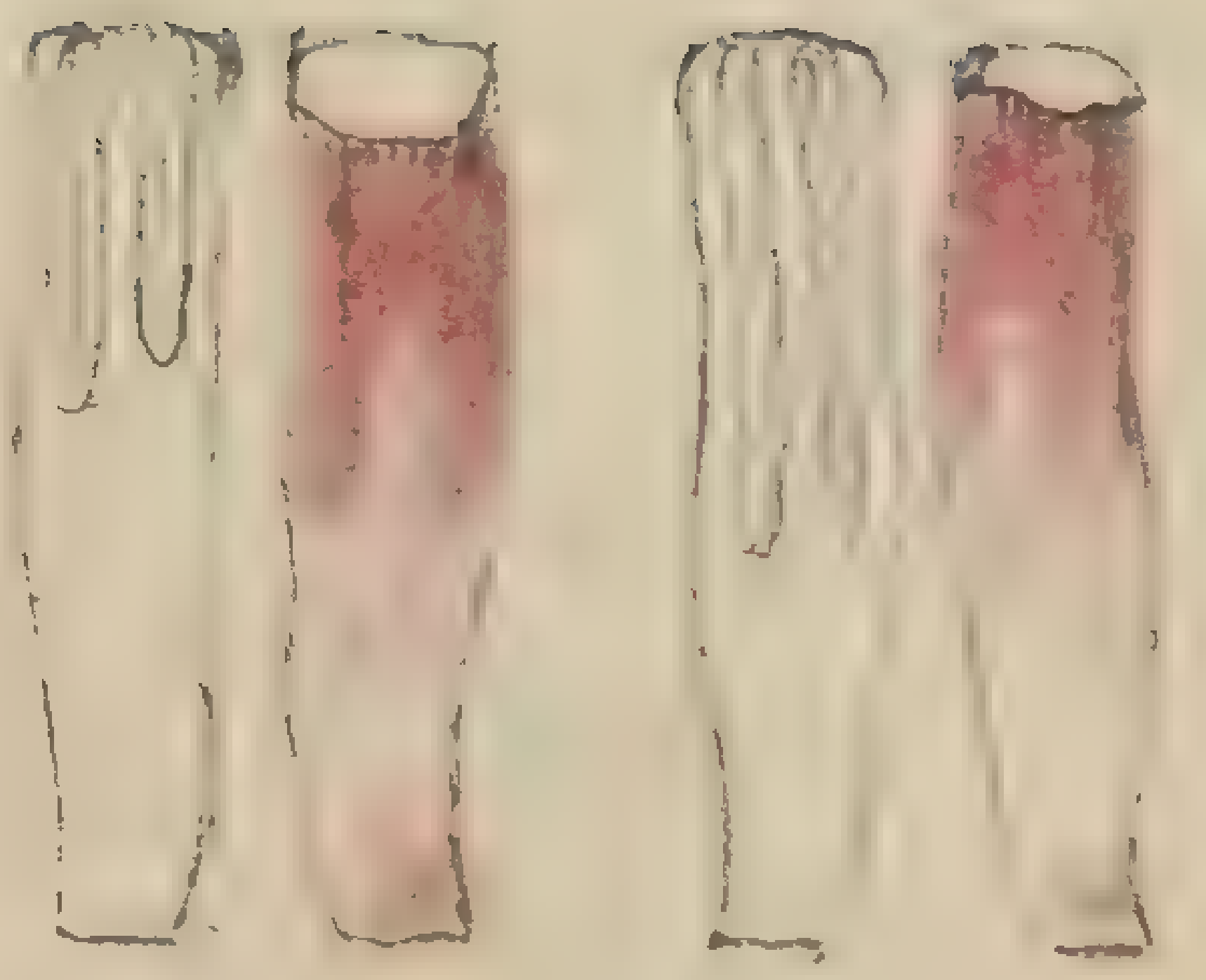
17 rays



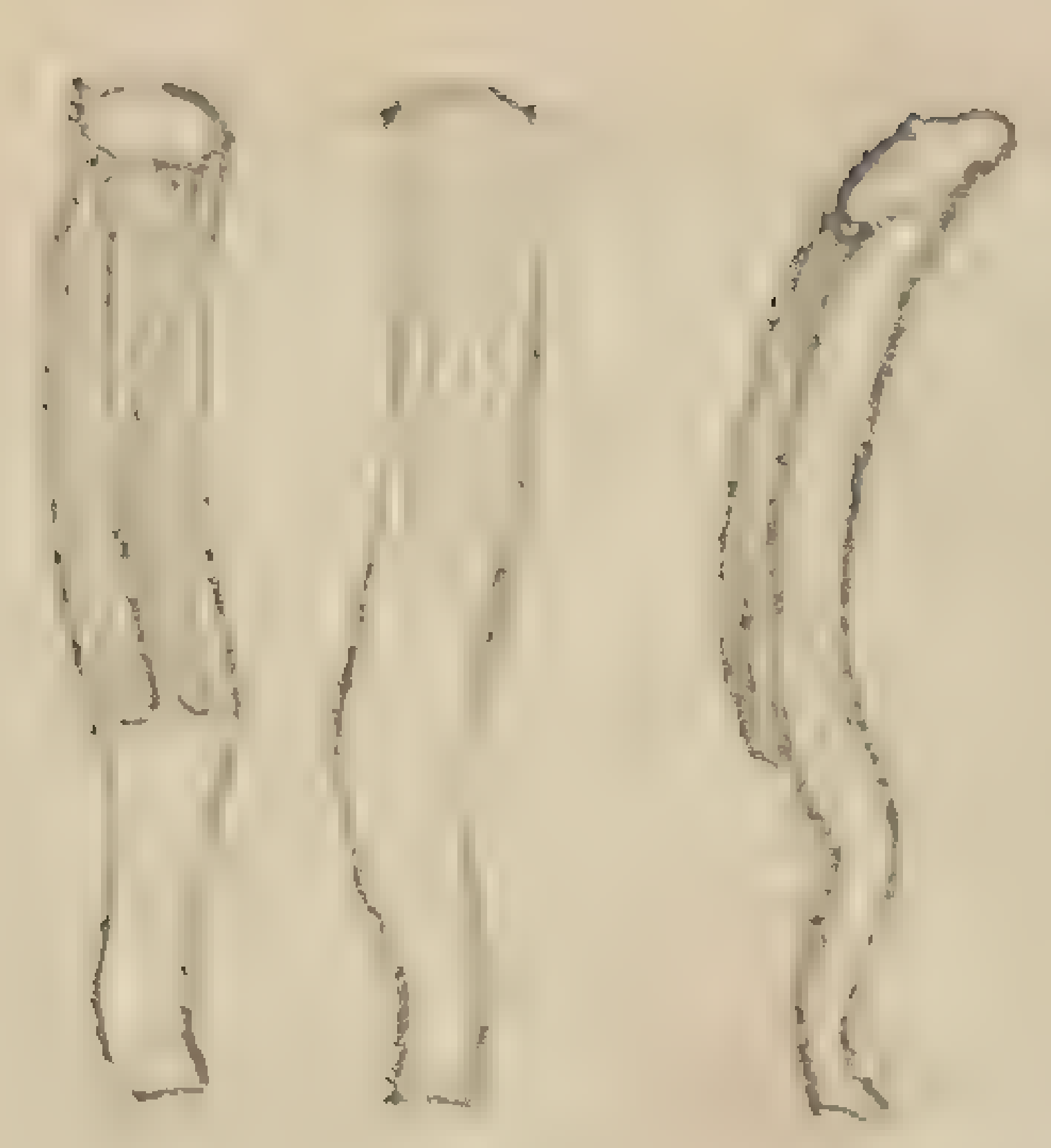
Stigma × 2

Diameter of flower
laid open 3 inches

2

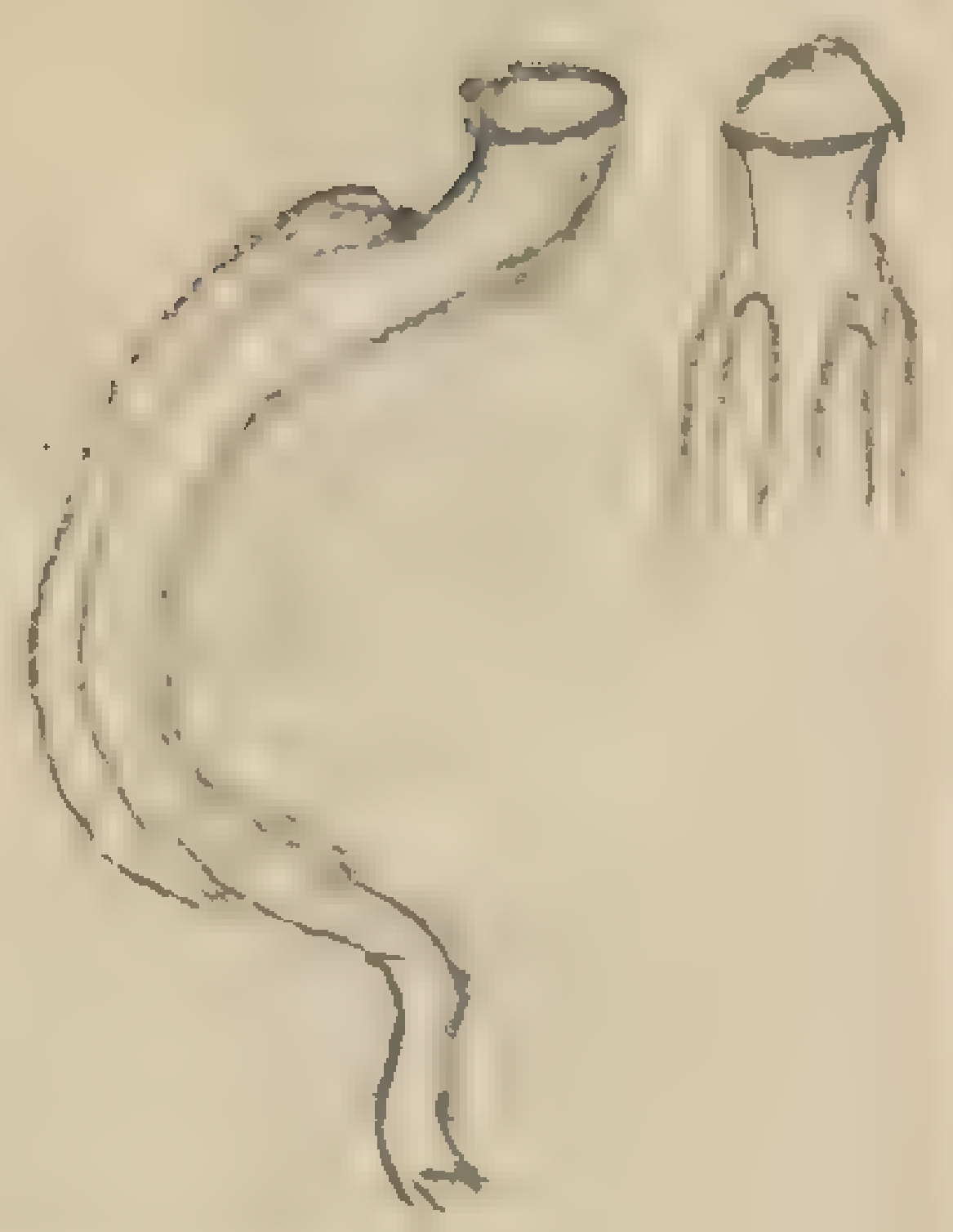


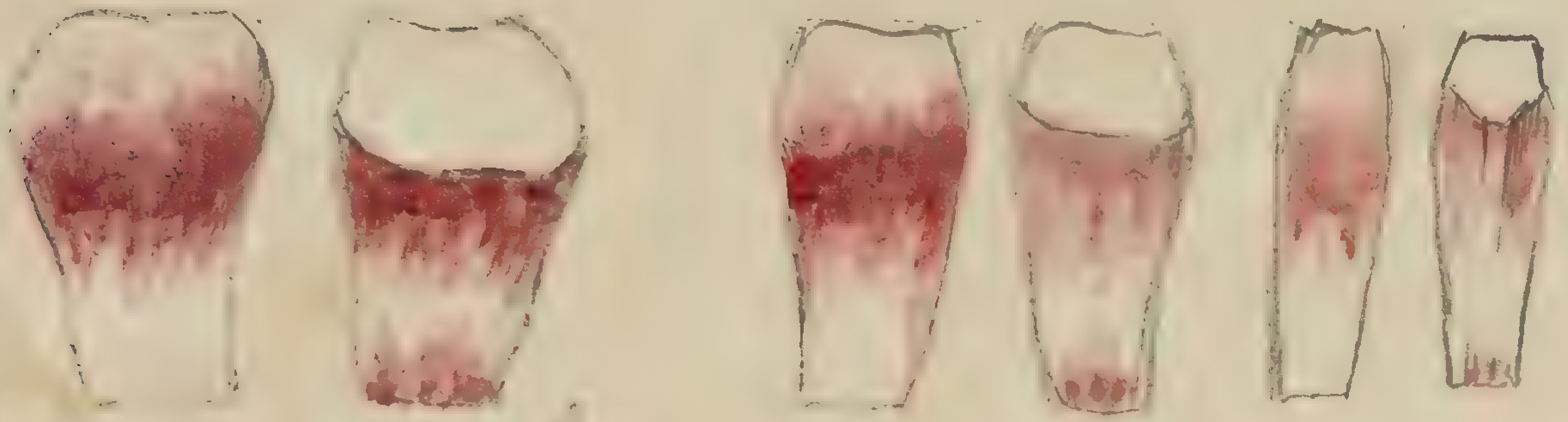
outer



inner stamens

innermost
stamen





Petals × 2

Deep red stains the petals on
both sides, and at base only on outside

91

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"Petalis nullis" Michaux. flora I. 312
"Antheris subsessilibus" Nymphaea longifolia

"Petalis nullis" Pursh II. 370
"Anth. subsessilis" Nuphar sagittaefolia
Low. Carolina to Salisbury

Elliott II. 3 has the same, but says
he has never seen the flowers
and the fruit; stigma 14 rays; margin
entire

"Petals none"
"anthers subsessile" Torrey & Gray I. 58

Petals transformed into
stamens Chapm. 20
(nothing about stamens)

DC. Prod 1. 116 copies Pursh

Alex. Leitch,

APOTHECARY & CHEMIST,

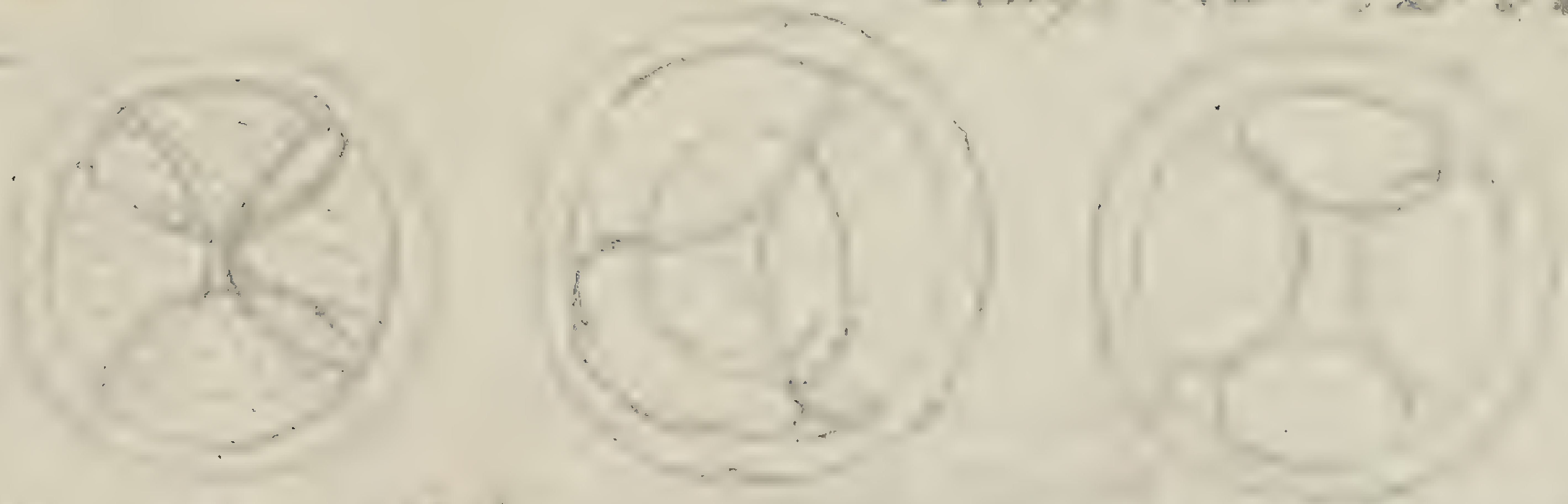
Cor. 4th & Olive Sts., St. Louis.

Nuphar

Feb 2d 1866

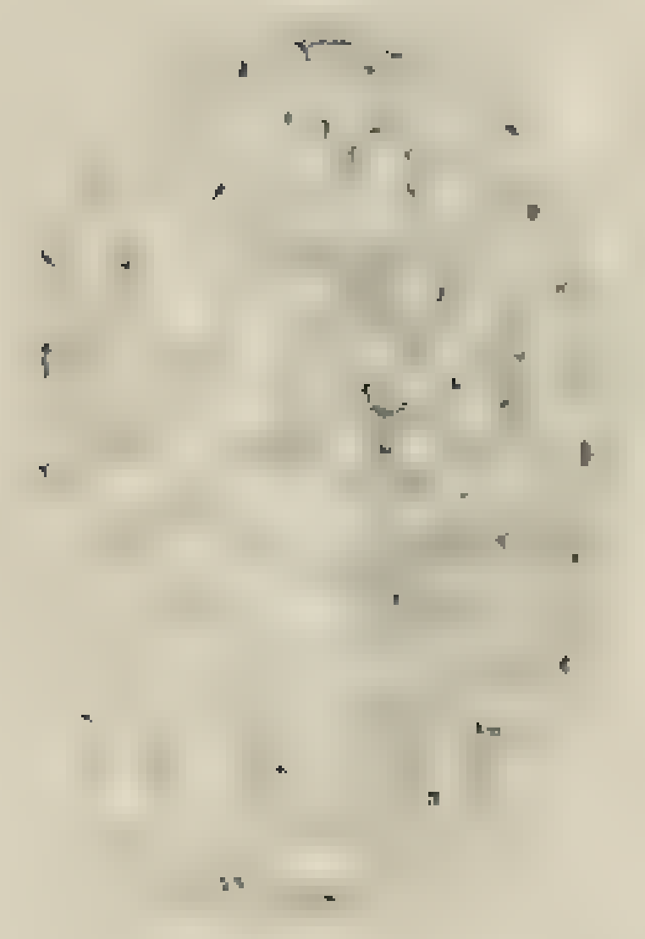
Com. Rob. Dr Parry June 1866

×15



Mother cells dividing to pollen grains

from unripe flowerbud



single pollen grain

107

CHEMIST

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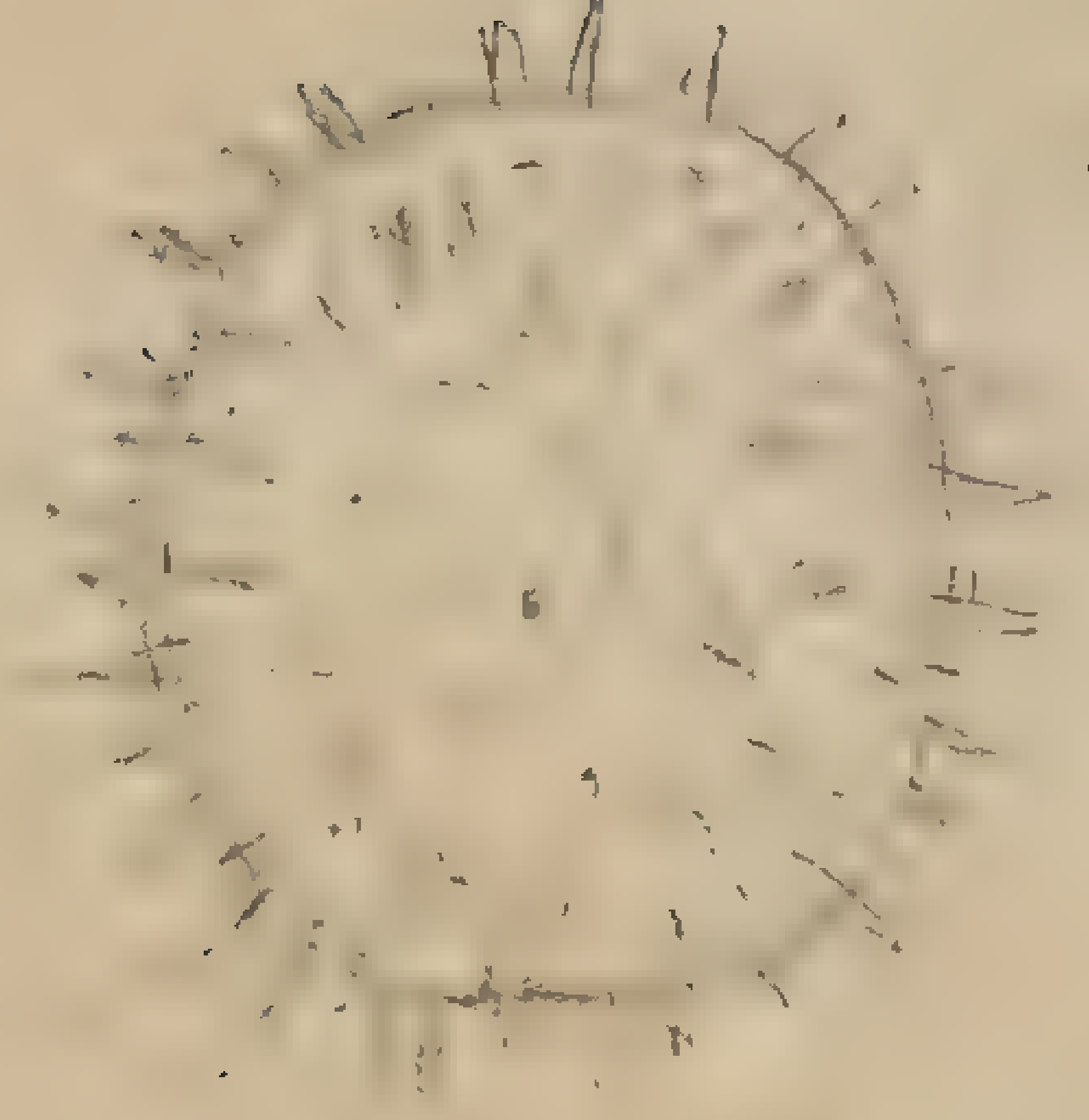
June 8 1885

Pollen of [illegible] magnificum

×415



Hayden Spec. '60

0.045 mm in diameter

[illegible] [illegible] has pollen of same size & shape

109

X. LEITCH,

& PHARMACEUTIST,

Fourth & Olive Sts. St. Louis, Mo.

GARDEN
GEORGE ENGELMANN PAPERS

Petals & Stamens Dec 30 1865

N. variegatum petals cuneate truncate, etc as in advena as long as outer, a little shorter than inner stamens; outer ones with a thick glandular dorsal appendage, like the petals; anther shorter than filament or sometimes as long. anther of inner stamens as long or a little longer than filament; with a short flat appendage, ~~turned~~ glandular anteriorly.

N. polysepalum petals – cuneate spatulate ~~outer~~ ones, sepaloid inner ones truncate, not (scarcely) glandular as long as outer, much shorter than inner stamens; all stamens with anthers nearly equal to (or shorter) than filament; outer ones with a very short triangular dorsal appendage or rather thickened glandular part; inner ones with a small flat appendage, glandular anteriorly or (at least?) recurved.

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Petals & Stamens. Dec 30 . 65

N. luteum petals spatulate as long or a little longer than stamens Stamens of equal length, outer ones with anthers shorter than the filament and (almost) without appendage to connective (inner ones anthers of) a little longer than filament, with short appendage.

N. pumilum petals spatulate shorter than stamens; stamens few (comparatively), of equal length, inner scarcely different from outer ones, anthers oval or square, much shorter than filament, with a small recurved appendage.

N. advena petals cuneate truncate thick & fleshy upwards, with nectariferous surface upwards, apparently on back, as long as the outer stamens; inner stamens a little longer; outer ones with a thick glandular dorsal appendage, anthers as long or a little longer than filament; anthers of inner ones ~~with~~ twice or even three times as long as filaments, with a long rather flat appendage, glandulous anteriorly.

112

ALEX. LEITCH,
APOTHECARY & PHARMACEUTIST,
COR. 4TH & OLIVE STS., ST. LOUIS.

Nuphar

Dec 30 1865

Sepals 5 Stamens equal
Stigmatic disc entire or slightly undulate stamens as long as petals — N. luteum
— — deeply crenate, stamens much longer than the petals — N. pumilum

Sepals 6 outer stamens shorter than inner,
Stigmatic disc entire rays ending far from the edge — N. advena

— — crenate undulate, rays ending near the edge — N. variegatum

Sepals 9-12 — N. polysepalum

113

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Nuphar **Seeds**

Dec 20 1865

Seed pyriform → N. luteum
N. pumilum
N. advena

Seed globose N. polysepalum ?
N. variegatum

Stigmatic disc

Disc entire or slightly undulate
rays ending far from edge N. advena
— — close to the edge N. luteum

Disc crenate
slightly, or crenate-undulate
rays ending near the edge N. variegatum
N. polysepalum.
deeply crenate N. pumilum

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Oct 30 1865

Nuphar, Anthers and Pollen

Pollen grains, when soaked, are spherical; originally there are 4 in each mother cell, each oval or rather lanceolate, triangular; when dry they retain this shape.

The few grains examined seem to be of different size

N. advena	diam of Pollen	0.047 mm
N. variegatum		0.048 – .051 mm
N. polysepalum		0.050 – 0.053 "
N. pumilum		0.052
N. luteum		0.054

116

The anther is wider broader than the connective, and therefore visible from the back in both 5 sepaled species

It is narrower ~~smaller~~ than the broad petaloid connective, therefore not visible from the back in the 6 – many sepaled American species.

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Nuphar Petals & Stamens Dec 30 1865

Petals spatulate without glandular nectariferous surface, or with
with a small nectariferous gland on the back

Stamens of equal length
as long as petals ——— N. luteum
much longer ——— N. pumilum
Inner stamens much longer than outer ones N. polysepalum

Petals cuneate truncate, thickened upwards with a
smooth glandular surface towards the top, especially on back
Inner stamens, longer than outer ones.

Anther as long or little longer
than filament N. variegatum

Anther (at least of inner stamens)
much longer than filament N. advena.

ALEX. LEITCH,
APOTHECARY & PHARMACEUTIST,
COR. 4TH & OLIVE STS., ST. LOUIS.

[illegible] 1865

Dr Bigelow has sent Nuphar seeds 1865

1.	Globose,	large	in Herb.	labelled:	Park house marsh	large good fruit
2.	"	"	in letter	"	"	
3.	"	"	in Herb	"	Bloody run	small young fr
5.	"	small	in Herb with 6	"	Conners Creek	leaves floating mashed fruit
4	"	"	in letter	"	Belle Isle	
6	pyriform	large	in Herb with 5	"	Conners Creek	leaves floating mashed fruit
7.	"	small	in herb		May's Creek.	very unripe fruit

118

1–5 globose seeds N. variegatum

6–7 pyriform seeds N. advena

3.4.5. & 7. are correctly labelled probably but 1 & 2 and 6 are transplaced

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PHARMACEUTICAL
Preparations,
FINE CHEMICALS,
And all the
New Remedies.

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CORNER OF
Fourth and Spruce Streets,
ST. LOUIS.

DISPENSING
AND
MANUFACTURING
PHARMACEUTIST.

Nuphar

	Petiolus	Sepala lutea	Petala	Antherae	Stigmatis radii	Semina
1. N. luteum	teres	5.	spatulata	anthera linearis breviter appendiculata, filamento vix longior	ad marginem subintegrum excurrentes	
2 N. pumilum (Kalmianum, Spennerianum).	anceps?	5	spatulata	anthera ovata s. quadrata ~~breviter~~ recurvo-appendiculata filamento multo brevior	ad marginem crenatum excurrentes	pyriformia
3. N. advena	teres	6.	truncata	anthera linearis longius appendiculata, filamento multo longior	ad margine subintegro longe sejuncti	pyriformia
4 N. variegatum	~~angulatus~~, anceps	picta 6.	truncata	anth. linearis brevius appendiculata, filamento aequans s. vix longior.	ad marginem crenatum excurrentes	subglobosa
5 N. polysepalum	teres	9-12	truncato-spatulata	anth. linearis brevius appendiculata filamento vix aequans	ad marginem crenatum excurrentes	pyriformia

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